Anthony Sully

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Foreword

The design of existing spaces, architectural or otherwise, to suit a newly required use seems to me to be an entirely honourable, engaging and optimistic way to spend your life. Interior Designers have focused on 'up-cycling' tired or unwanted spaces for years and there is no other design discipline that focuses entirely on reworking spaces in this way.

Common with many design disciplines, Interior Design is concerned with colour, form, space, light, texture, materiality, fashion, structure, sound, technology, environment and context. Its focus enables it to explore the interface between disciplines, from Landscape and Architecture to those within the built environment, Furniture, Furnishings, Product & Textile Design. Its mission is to seek out how places could be better used, or simply reworked to lift the spirits … how our spaces can or should work and function for our current requirements, at a human interface—as I said, an entirely honourable, engaging, optimistic and rewarding way to spend your life!

This book is a follow up to Anthony Sully's book **Interior Design**: *Theory and Process* and aims to encourage students and practitioners to think deeper about the subject and explore underlying conceptual thinking fully when formulating a new design. He argues that the common acceptance of a major concept that sums up an interior design scheme needs to be reviewed. In his last book he broke down this dominant concept into eight minor ones, seven of which form the basis of this book. Challenging accepted norms, Anthony has set out the most delicate aspects of the design process, namely conceptual thinking, into a clear and understandable format. He encourages designers to separate colour from materials, for example, in order to understand their properties and characteristics in isolation. He also acknowledges various degrees of connectivity or overlap between each concept.

Good design emerges not just from the work of the designer but is nurtured by something in the air, a moment in time, a set of circumstances, by certain people coming together around a uniting thought. Designers need to act as film directors pulling together the talents of many to achieve a unified piece of work. They

need to work collaboratively and this book will give useful insight into the process to all involved in and around the design process, students, teachers, academics and potential clients. Books on the theory of Interior Design are hard to find and I welcome Anthony Sully's latest addition.

March 2015 Julian Powell-Tuck

Preface

There are two camps in the discipline of interior design which seem to me to be drifting further apart: the profession on the one hand and the education and training on the other. The profession marches onwards, following technological inventions, a proliferation of new products and paying lip service to the architectural profession in a subordinate role. The continued dominance of the 'Modernist' tradition is proving stifling, not only in teaching but in practice as well.

Professionally, we have the interior decorators, who work mainly in the domestic field, and are in a completely different mode to the more commercial designers. Interior Design is an activity that embraces construction, furnishing, building services and decoration. The Interior Designer takes charge of all of this. He/she may employ specialist craftspeople, contract furnishers, engineers and decorators. The scope of work covers all sectors such as commercial, retail, residential, education, sport, entertainment, travel stations, hospitality, medical civic and so on. The specialist decorators have taken on an independent consultancy role of their own calling themselves Interior Decorators whilst concentrating mainly on residential only. They do not usually get involved in construction.

We also have a breed of interior architects, a term that is more recognised in Europe than in the UK, and whose title I have challenged in my last book 'Interior Design: Theory and Process'. Interior Design is the more common generic term and is one that I shall continue to use. The professional work live in the field and new developments/products arise out of the designer's own exploratory research, as well as manufacturers chasing the demands made by the consumer. All participants in the design industry also acknowledge pressure from politicians and 'Green Issues' to act upon such signposts that indicate ways forward which will benefit humanity and undo the wrongs of the past. Employers complain about the inadequacy of many graduates coming out of university, saying that they are not primed to work in the industry. They argue that the students' studies are so detached from reality that they do not sufficiently prepare them for professional work. The university sector has a very difficult task confronting them. On the one hand, they need experienced practitioners to teach and pass on the benefits of their experience, and on the other hand, they need academics to stretch the students'

minds and be exploratory and inventive. The full-time staff managing the courses are usually the academics, and the part-time visiting staff provide the hands-on professional approach because they are in practice.

There are also new branches of activity that have grown over recent years or have yet to confirm a union that I consider to be a threat to the recognised professional role of the designer. These new fields come under such titles as Design Thinkers, Behavioural Scientists, Systems Analysts and Social Psychologists. Whilst some valuable work is being done within these fields, they are beginning to assert undue influence upon the design process in such a way that they are subjugating the role of the designer. I have read that they have been welcomed into the industry because of criticisms of the way designers have spent too much time in the past on aesthetics and less on the needs of the client or user. I cannot believe that this is correct if my own education is anything to go by. I was taught about how design integrates aesthetics, function and technology and how much the needs of the user were of prime importance. Even new degree courses have sprung up such as Service Design for which the following definition applies:

Service design is the activity of planning and organizing people, infrastructure, communication and material components of a service in order to improve its quality and the interaction between service provider and customers.

When the service industry is discussed, it usually refers to both public and private sectors and covers such areas as transport, food catering, retail and hospitality, in fact anything whereby a service is being provided to a paying customer. As far as I can see, this work comes within the remit of the existing interior, product or architectural designers already. My guess is that the client management of these service providers has not been as good or sharp as they should have been in briefing the designers adequately, and hence, this additional focus has appeared as a move to improve the service. Whatever new developments are taking place within the industry, the contents of this book should still apply and be useful.

The education and training of interior designers still varies greatly throughout the world. Member organisations are listed in the Appendix. Higher education has become big business throughout the world, with individual universities competing for either more overseas student applicants, funding grants or creating partnerships with foreign institutions. All of this is designed to boost the income of the instigating university, as well as help the less able ones to raise their game and become HE global influencers in their own right. The logical outcome of this scenario, as is already happening, is that the junior member of these partnerships will become so strong and well equipped in their own right that they will not need the services of these host universities in the future. Professor Sir Fergus Millar wrote a letter to the Times in 2013 about what is happening to HE in the UK. I quote:

'…it is not that funding is sought in order to carry out research, but that research projects are formulated in order to get funding…the lecturer whose fulfilment comes from teaching…now risks, at best, being publicly humiliated as "non-research-active…and at worst being dismissed. The present system is profoundly damaging, not only to teaching but to research itself.'

The last few years have been witness to a global recession, which has had ramifications on the educational system in the UK. Here is a quote from a paper delivered by Patrick Hannay[1] at the Interiors Forum in Scotland in 2007:

Knowing as we all do, that staff-student ratios have risen dramatically, and that while we may have tightened up on our delivery techniques, we all have witnessed, if we are honest, at least in England and Wales, the erosion of content and substance through stretching too few tutors over too many students, while studio space is cut from beneath our feet.

I have seen departmental budgets cut back over the years much to the detriment of the education of students. What I find distressing is that the industry has huge expectations on the quality of graduate that is required, but there does not seem to be any reciprocal gesture of assisting towards the funding of our design courses. No doubt there are exceptions to this and a shining example is the new campus of Ravensbourne college built adjacent to the O2 Arena in south-east London. Apart from the normal institutional funding sources the college manages to secure private funding from the media industries that it serves. Art and Design in the UK used to be taught in independent colleges of art and many of these were founded in towns that had local industries that were able to support them; for example, Staffordshire University's art and design grew out of the potteries in Staffordshire; Nottingham School of Art (now Nottingham Trent University) grew out of the textile and lace industry of Nottingham; Stourbridge, glass; Manchester, the cotton industry; Leicester, hosiery; Birmingham, metalwork; High Wycombe School of Art (now Buckinghamshire New University) grew out of the furniture industry of High Wycombe; Kidderminster College for the carpet industry; Coventry for transport design (car industry); and so on. Today, the scene has changed so much with some of these industries in decline, whilst new ones due to the digital revolution are emerging.

Each chapter in this book deals with seven of the eight concepts mentioned in the Introduction. The formation of these concepts is not bound by any dictatorial ruling as that would be counterproductive to the essence of creativity, which is not premeditated or controlled by any external force. This book is intended as a guide, whilst at the same time I hope will be inspirational. How are concepts formed? I need to emphasise that the design process is not strictly linear, but can jump about according to varying conditions or extenuating circumstances. It is also unpredictable as it should be, for the outcome is not known, but is there to be discovered. It is called innovation. This is the kernel of excitement about design: nothing is predictable. If it was, and I suspect that much of the poorest quality of design falls into this category, then it is probably the product of repetitive methods whose main focus is to reap financial rewards at the expense of quality. Later in this book I refer to the designer's vision of what could be done, and this is the fuelled

[1]Patrick Hannay, *A Regulated Irregularity,* Paper at Interiors Forum Scotland, 2007. Patrick was formerly Course Director of the Interior Architecture Course at the University of Wales in Cardiff and is now editor of Touchstone magazine.

beginning that gives impetus to the design process. There could be many visions covering the whole space, or the use of certain materials, or methods of access, or colour and lighting and so on. These visions help to form each one of the concepts in this book.

The book is written with definitions, suggestions, classifications and analysis. I have used examples of products and interiors where they serve to illustrate the point I am making, or the topic heading of that particular paragraph. Otherwise I have drawn my own diagrams and drawings to help with clarification.

John Ruskin wrote 'The Seven Lamps of Architecture' in 1907 and I pondered upon the relevance to my seven concepts loosely matching them as follows:

Ruskin's seven lamps		My seven concepts
SACRIFICE—about giving	>	Circulation—guiding people
TRUTH—being honest	>	Lighting—lighting the way
POWER—talent, responsibility	>	Planning—powerfully generative
BEAUTY	>	Colour
LIFE—about people, expression	>	Materials—we find and shape
MEMORY—history, habits	>	Construction—build on prior experience
OBEDIENCE—duty	>	3 Dimensions—provision to the client

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Contents

1 Planning Concept 1
- 1.1 Context: Organisation of Space, Enclosure and Support Systems—Keyword: Geometry 2
- 1.2 Stage 1—Bubble Diagrams 3
- 1.3 Stage 2—Overall Planning Structure 4
  - 1.3.1 Plan Patterns 5
  - 1.3.2 Interior Plan Examples 8
- 1.4 Stage 3—Interior Divisions/Support Systems 10
  - 1.4.1 Furniture/Support System Example 10
  - 1.4.2 Division/Door Opening 12
- 1.5 Drawing—The Starting off Point 14
  - 1.5.1 Grids 17
- 1.6 Enclosure and Journey 18
- 1.7 Case Study 1—The Journey 19
- 1.8 Layers 20
- 1.9 Placement of Object—Orientation and Positioning 22
- 1.10 Case Study 2—Ardmore Park 23
- 1.11 Case Study 3—China Steel Corporation HQ 25
- 1.12 3D Planning—Includes Enclosing Forms and Support Functions 28
  - 1.12.1 Major Conceptual 3D Planning Elements 29
- 1.13 Conceptual 3D Origins Within a Space 33
- 1.14 Case Study 4—Placebo Pharmacy 34

2 Circulation Concept 37
- 2.1 Context—Circulation Options—Keyword: Routing Access 38
- 2.2 Horizontal Circulation Options 42
  - 2.2.1 Option 1—Well-Defined Route/s 43
  - 2.2.2 Option 2—Multi-directional 44
  - 2.2.3 Option 3—Corridor-Type Directional 45

2.3 Vertical Circulation Options . . . 47
2.3.1 A—Incline . . . 48
2.3.2 A1—Straight Staircase or Ramp . . . 48
2.3.3 A2—Escalator . . . 48
2.3.4 B—Vertical . . . 49
2.3.5 B1—Helical Staircase . . . 49
2.3.6 B2—Elevator . . . 49

3 Three-dimensional Concept . . . 53
3.1 Context—Keyword: Modelling . . . 54
3.2 Constituent Parts . . . 54
3.3 Realisation Sequence . . . 56
3.3.1 On Entering a Space . . . 57
3.4 Identity . . . 59
3.5 Basic 3D Geometric Origins of Form . . . 61
3.6 Family of Forms . . . 62
3.6.1 The Square Family . . . 62
3.6.2 The Circle Family . . . 63
3.6.3 The Triangle Family . . . 64
3.7 Junctions and Meeting of Surfaces . . . 67
3.8 The Meeting of Planes . . . 68
3.9 The Intrusive Corner . . . 70
3.10 Growth of the Integrated Interior . . . 75
3.10.1 Architectural Form . . . 75
3.10.2 The Hazukashi House . . . 77
3.10.3 Interior Form . . . 78
3.11 Freeform . . . 88
3.11.1 Case Study 5 . . . 88
3.11.2 Grotto Sauna . . . 90
3.11.3 The Deconstructed Interior . . . 92
3.12 Is Minimalism the Disintegrated Interior? . . . 98

4 Construction Concept . . . 101
4.1 Context—Keyword: Making . . . 102
4.2 How Things Come Together . . . 103
4.3 Interadapt—New Word! . . . 105
4.4 Construction Choices . . . 108
4.4.1 Fixing to Structure . . . 108
4.4.2 Fixings . . . 108
4.4.3 Fixed Support System . . . 111
4.4.4 Blockwork Partitions . . . 112
4.5 Object-to-Object Fixing/Support Systems . . . 114
4.5.1 Door to Partition . . . 114
4.5.2 Worktop to Supporting Framework . . . 118
4.5.3 A Table . . . 122

4.5.4 A Chair . . . 124
4.5.5 Shelf to Supporting Framework . . . 126
4.5.6 Stair Tread to Supporting Framework . . . 129
4.6 What is Expressed or Seen? . . . 133
4.7 Glass for Buildings . . . 137
4.8 Summary Diagram of Major Players . . . 137

5 Material Concept . . . 139
5.1 Context—Keyword: Finish . . . 140
5.2 What Governs Selection? . . . 140
5.3 Natural . . . 141
5.3.1 Natural Source Through Industrial Process . . . 142
5.4 Artificial . . . 142
5.5 Enclosure . . . 144
5.5.1 First Inclinations . . . 146
5.5.2 Unit Type—Brick and Concrete Block . . . 147
5.5.3 Frame and Panel—Timber, Metal and Glass . . . 147
5.5.4 Cast Form—Concrete, Reinforced Plaster and GRP (Glass-Reinforced Plastic) . . . 147
5.6 Structure . . . 149
5.6.1 Case Study 6—Surfrider HQ . . . 150
5.6.2 Pallotta Teamworks . . . 152
5.6.3 Rockstar Villa . . . 153
5.7 Surface Finishes—Applied or Integral . . . 153
5.7.1 Alliance with Structure . . . 154
5.7.2 Location . . . 154
5.7.3 Apportionment of Area—Quantity . . . 154
5.7.4 Type of Skin (Applied) . . . 155
5.7.5 Soft or Hard . . . 156
5.7.6 Reflectivity . . . 156
5.7.7 Colour and Texture . . . 156
5.7.8 Fixing/Installation Considerations (See Chap. 4 on Construction) . . . 157
5.8 Support Systems . . . 158
5.8.1 Seating . . . 158
5.8.2 Desking . . . 160
5.8.3 Tables . . . 160
5.8.4 Workbenches/Counters . . . 161
5.8.5 Shelving—Open . . . 161
5.8.6 Cupboards—Enclosed Shelving . . . 162
5.8.7 Chests . . . 162
5.8.8 Cabinets (Usually with Glass Doors) . . . 162
5.8.9 Beds . . . 163
5.8.10 Wardrobes . . . 164

5.8.11 Storage Units 164
5.8.12 Handrails, Railings and Balustrades 164
5.8.13 Bathroom/Sanitary Equipment 165
5.8.14 Other Specialist 167

6 Colour Concept 169
6.1 Context—Keyword: Effect 170
6.2 The Landscape of Choice 171
6.2.1 Colour in the Abstract 171
6.3 What Governs Selection? 174
6.3.1 Single Colour Dominance 174
6.3.2 Compositional Emphasis—Where a Particular Colour(s) Is Dominant in Space or on an Object 177
6.3.3 Blend of Colours 178
6.3.4 Location 179
6.3.5 Proportional Judgement 182
6.3.6 Shape 183

7 Lighting Concept 185
7.1 Context—Keyword: Mood 186
7.1.1 Artificial Light 186
7.1.2 Natural Light 187
7.2 Artificial Light 187
7.2.1 General or Ambient Lighting 188
7.2.2 Task Lighting 191
7.2.3 Accent Lighting 193
7.2.4 Decorative Lighting 197
7.2.5 Illuminated Objects 202
7.3 Natural Light 205
7.3.1 Windows 207
7.3.2 Glazed Walls 209
7.3.3 Rooflights 212
7.3.4 Clerestory Window 217
7.3.5 Entrances and Exits 219
7.4 Summary Diagram 222

Conclusion 225

Appendix 229

Index 235

Introduction

These organisational methods include balance, arrangement, sequence, scale and proportion; when used effectively, unity results…

Both the visual elements and their organising principles serve to form a tangible entity from the designer's concept.[2] **Malnar and Vodvarka**

In my first book 'Interior Design: Theory and Process', I described the basic format of study of this discipline with appropriate historical references as well as proposing ways forward in establishing some kind of code or language that I consider is needed in the face of so much present-day free-for-all anarchic design solutions. I explained the whole sequence of the design process, and part of that process is the formation of ideas that engages the designer with the elements of designing an interior. The term 'idea' has multiple applications and is used in common parlance. In design, we refer to these ideas as concepts.

The contemporary use of concept as an architectural design method developed over several centuries and owes much to the idea that architecture (Interior design), *like art, must express something beyond its own materiality.*[3] **Philip Plowright**

Many books have been written about interior design, interior decoration and its associated disciplines of architecture, furniture, products and crafts. As far as I know there has never been a book written about the concepts of interior design or, indeed, analysing what these are. The theoretical basis of interior design, as outlined in my last book, is based upon a core of the following as the main ingredients:

Geometry—measured shape, form and proportion
The human form—demanding needs for the activities
Perception—controlling what we see
Expression—reasoning of why with conclusive effect

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[2]Joy Malnar and Frank Vodvarka, *The Interior Dimension* (New York, Van Nostrand Reinhold, 1992) p. 36.

[3]Philip Plowright, *Revealing Architectural Design* (London, Routledge, 2014) p. 245.

The grand concept of a design scheme, which uses the above, has been commonly used, but that is a post-descriptive term to explain the final design. The breakdown into different concepts in this book is an attempt to explain the deeper workings of each one in order to strengthen the designer's concentrated efforts in the design process and confirm the full status of a design scheme.

In this book, I would like to expand this study to see if this helps to regularise interior design into a manageable and effective discipline. I intend to focus upon seven of the eight concepts that I listed in my last book that generate the main concept of a scheme and explain how they can be formed and how they interrelate. I am also in pursuance of a climate that is free of the strictures of style such as Modernism.

As Salingaros says:

In architecture, the stark modernist interiors that came of age with Adolf Loos and later with the Bauhaus have been very unsuccessful in eliciting the type of universal and visceral attraction and sense of comfort that more traditional interior environments accomplish, as witnessed by what the majority of the population chooses as their living interiors. People like to bring objects such as photographs, plants, dolls, and objets d'art into their living space and workplace. This practice has been condemned by a rather narrow design élite that continues to support the old minimalist design ideology against overwhelming evidence of what makes people most comfortable.[4]

My research has uncovered much discussion and expositions by writers who are trying to explain what interior design is (definitions, discipline, profession), where it has come from (history, which I have covered in my first book), exploring the field of interior design (design research, philosophy), who uses interiors (the users, behavioural studies), the importance of interior design (social contribution), healthy interior design (responsibility, sustainability) and effects of interior design (people responses). I intend to continue to redefine the core of what and how interior design is formulated.

So, I am still dealing with the conceptual growth of ideas as opposed to the practical applications of material and construction technology, and the statutory regulations that accompany such subjects. The two driving forces willing the birth of a concept are inspiration and motivation. Sources of ideas exist in all aspects of life from culture, industry, politics, philosophy and the community. Such sources are considered to be *outside* the discipline of design, whereas those sources that come from within the knowledge base of the discipline are considered to be '*inside'* the discipline. This book is concentrating on the inside sources. A concept is not to be confused with a 'Style', which usually refers to an established visual theme both historical and modern that fits a certain social strata.

[4]Nikos Salingaros, *Fractal Art and Architecture Reduce Physiological Stress,* Article 2012.

While a style, so far, has been defined in terms of a few particular formal traits common to a number of works of art, we should rather let 'style' imply the formal probability structure of a symbol system.[5] **Christian Norberg-Schulz**

Aside from dress, décor is the most immediate extension of the body; it constitutes a language, a set of signs, a definite notion of the art of living at a particular moment in time.[6] **François Baudot**

Style implies a group of different products that belong to each other by common physical properties or linking devices, which produces a visual assemblage. Their total assembly is unique and can be compared with other assemblies whose products will have different properties, thus creating another 'style'.

I do not aim to ponder on the wider social needs of society, gender issues or global and market forces that help shape our future as such issues are well covered elsewhere. In my professional experience, the design process has been led by an overarching concept supported by subordinate elements that have been dictated to. For example, the major concept for a cinema interior may be a combined historical, rich and comfortable atmosphere. One of the subordinate elements would be lighting which constitutes a huge range of fittings and effects. In order to plan and specify the lighting, the designer needs to have a concept of it. This will define effect, control, duration, location and so on. I have analysed these subordinate elements and concluded that their roles should not be secondary to the main concept, but rather, they need to be raised on an equal footing in order to sharpen and improve the interior designer's skill base. Their contribution will still help to form a dominant concept. These elements form the concepts of this book for each chapter, and they will be described in terms of their content, their boundaries of subject and their overlap with each other.

In addition, an overall conceptual position can make it easier to engage in synthesis during the refinement stages of the design process as there is a clear set of judgement criteria, fixed by the conceptual position to guide the formation of the whole.[7] **Philip Plowright**

Interior design has always proved to be a slippery field of work and study in terms of defining what it is, so in order that the reader sees my book in context here are some views by others as well as myself.

Interior Design Education and Practice

It is often debated as to whether it is necessary for a designer to be able to draw freehand. I maintain, and any professional designer will say the same, that drawing is a vital part of the design process by being an extension of the brain and

[5]Christian Norberg-Schuiz, *Intentions in Architecture* (Massuchusetts, The MIT. Press 1965) p. 70.

[6]Francois Baudot, *Compendium of Interior Styles* (New York, Assouline, 2005) p. 7.

[7]Philip Plowright , *Revealing Architectural Design* (London, Routledge, 2014) p. 252.

eternalises the visual powers of expression. In other words, it is a process of giving form and shape to mental visions. It is therefore a means of obtaining feedback from the drawing and enables the designer to make changes over a period of time. It is about making emotional gestures, which are given form and eventually become representations of the design.

It is through drawing that we not only explore the possibilities of new design but also acquire the fundamental language of architecture. (Interior Design).[8] **Simon Unwin**

There are different and opposing views of what constitutes critical interior design. Historically, North American interior design research has leaned towards the pragmatic and has tended to concern itself with practical problems as opposed to philosophical ones. **Abercrombie 1990; Guerin and Martin 2001**

There is a disparity between the theories used to teach interior design and the actual act of designing. Some of these theories are ascribed as objectivist and absolute truths (Mitchell 1993; Kruft 1994). Notions of truth, beauty and values embedded in assumptions about what constitutes design in general, and interior design in particular, are often taken for granted (Ainley 1998; Vaikla-Poldma 2003). **Tiiu Poldma**, University of Montreal, Canada, 2003

Despite significant variation in regional approaches to interior design nomenclature, regulation accreditation and research, there is global agreement about the contested and problematic nature of the identity of interior design. **Joanne Cys**, University of South Australia, 2008. Paper: 'Undisciplined'.

Increased complexity in the design of interior environments has demanded a more focused expertise and skill set related to sustainable interior materials, ergonomics, design for multiple populations, ADA compliance, workplace design, facilities management, interior lighting and other aspects of the built environment focused at the interior scale. **John Weigand**, article 'Interior Design and Architecture', Design Intelligence. March 2013

Interior Architecture

The use of the term interior architecture is viewed by some as yet another threat to a profession that others would argue has constantly had to defend itself since the title of interior design was adopted in the 1960s. It seems that we have not done as adequate job of communicating exactly what it is that we do or the value that we bring to the table.

So given our past history, the public perceptions of our profession and the seemingly continual fear that interior design will be subsumed by architecture, what are we to do when at times our future is being challenged and seems bleak? **Allison Carll White**, Ph.D., University of Kentucky. *Journal of Interior Design*, IDEC 2009

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[8]Simon Unwin, *Analysing Architecture* (Routledge, London,2014) p. 4.

There is a fine line between architecture and interior design in this book. In terms of the subject matter of interior environments, these disciplines become one and the same: elements present in the design of interiors, whether architectural or decorative, contribute to the qualities of the same place.[9] **Roberto Rengel**, University of Wisconsin-Madison

In terms of philosophy and practice interior, architecture is a discipline that is heavily (although not exclusively) involved with the remodelling and repurposing of existing buildings and so has an important role to play in the sustainable reuse of the built environment.[10] **John Coles and Naomi House**, Middlesex University

We may define interior architecture as the design of structurally created interiors, for domestic, recreational and business usage, which apply some architectural processes.[11] **Clive Edwards**, Loughborough University

Some of the ideas that characterise Interior Architecture are strong three-dimensional development, respect for the enclosing architecture, sensitivity to the human experience, primal significance of light, wealth and energy of colour and furnishings as an extension of the architecture.[12] **Kurtich and Eakin**, The School of the Art Institute of Chicago

Interior architecture is comprised of at least some elements of all three fields: design, architecture and art.[13] **Ellen Klingenberg**, Oslo National Academy of the Arts

Art and Design

Art and Design have been converging towards each other at an ever increasing rate over the past 30 years that this conjoined spirit is realised by leading artists and designers. Interior Design has to be charged with a creative spirit that seeks solutions which combines art and sculpture resulting in forms that work by storing, displaying, that facilitate working and that supports the human form. A designer works like an artist, and an artist works like a designer. **Anthony Sully** 2011

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[9]Roberto Rengel, *Shaping Interior Space* (New York, Fairchild Publications Inc. 2003) p. 10.

[10]John Coles and Naomi House, *The Fundamentals of Interior Architecture* (Switzerland, Ava Publishing 2007) p. 10.

[11]Clive Edwards, *Interior Design, a Critical Introduction* (Oxford, Berg, 2011) p. 2.

[12]John Kurtich and Garret Eakin, *Interior Architecture* (New York, Van Nostrand Reinhold, 1996) p. vii.

[13]Ellen Klingenberg, *Interior Architecture—a body of knowledge and a field for research* (paper 25.07.2009).

Interdisciplinary

…cross discipline work is too little encouraged in the art schools themselves. **Fred Scott—**'On Altering Architecture' 2008

It is certainly true according to my own experience that each department tends to build a wall around it for fear of outsiders affecting the controlled stability of management and inflexible programming. Compared with 30 years ago, there is certainly less of a sharing culture between academics who are striving to chase a PhD., partly due to university pressure to improve its own research ranking, but partly due to the academic's own protectionist methods as though sharing would devalue their efforts.

Interior design is an interdisciplinary practice that is concerned with the creation of a range of interior environments that articulate identity and atmosphere, through the manipulation of spatial volume, placement of specific elements and furniture and treatment of surfaces.[14] **Brooker and Stone**

Summary

From the above, it is clear that the problem of establishing what the identity of interior design is has become a common topic for debate. The emergence of 'Interior Architecture' as a renamed version of 'Interior Design' does nothing to clear the air or still the waters. After much research, I have come to the conclusion that there is no difference between them. Existing buildings need people to alter and adapt the existing structure and services right down to specifying furniture and internal decoration. This is what interior designers (and I am one of them) do already, so why invent another term? When it comes to interior design education, it is the American organisations of CIDA, NCIDQ and IDEC that lead the way with vast membership numbers and regulatory bodies.

From the previous list of authors, it is interesting to note Tiiu Poldma's comment about the disparity between theory (as taught and written about by academics) and practice as delivered by the professional designers. Geurin and Martin refer to the schism between practical thinking and philosophical thinking. Certainly in my experience, I have noticed that the height of academic research as witnessed by certain conferences and written papers does tend to wallow in what I call intellectual garbage. One term that has come out of this is the word 'interiority', which for the life of me I fail to understand. As readers will know who are familiar with my last book, I am a designer who regards writing as a creative

[14]Brooker and Stone, *From Organisation to Decoration* (London, Middlesex University Press, 2013).

extension to designing. I am not a researcher and therefore am not au fait with some of these ethereal works.

This Book

Design is an important human activity—we could speculate that it might even be the thing that makes us human—the ability to conceive, evaluate, innovate and propose. **Philip Plowright**[15]

What is a design concept? The written description of a concept tries to be the embodiment of the actual experience people will feel and see when they enter a space, so it is never the perfect way of communicating it. I refer to people in the generic sense instead of alluding to gender, age or cultural differences. To begin with a concept is an idea, a formation of something that will eventually drive an actionable reality within the interior that allows the activities of the project to take place.

Each chapter analyses the range of possibilities that the designer can examine and eventually decide by choice and conclusive belief the appropriate course of action to take in forming that particular concept. Below is the concept diagram as explained in my last book.[16] Planning, which is the topic of Chap. 1, is listed as one of the minor concepts, although I would emphasise that it is a very important and generating concept. One may ask why I have not included 'Decoration' as a concept. Decoration is too wide in scope and covers furnishing, lighting and surface finishes. These topics are already covered by the other concept titles, which I consider to be complete in the sense that they should cover every aspect of designing an interior. All of these interrelate at various times throughout the design process, and such analysis is an attempt to assert greater control over the design process and ensure that the creative energy of the designer is well harnessed.

My last book dealt with such theoretical topics as proportion, geometry, perception, human form and expression that provide the basis and reasoning for any concepts being created. Therefore, I do not intend to repeat these except where relevant. I also do not intend to repeat the client relationship, design commission brief nor define their needs and activities, but simply assume such work has been done for the conceptual growth of the project to begin.

I make no apology that my case studies are not in depth as can be found in other sources, but are used simply to illustrate a point that I am making. If the reader wishes to find out more about them, at least I have provided a stimulus for further reading.

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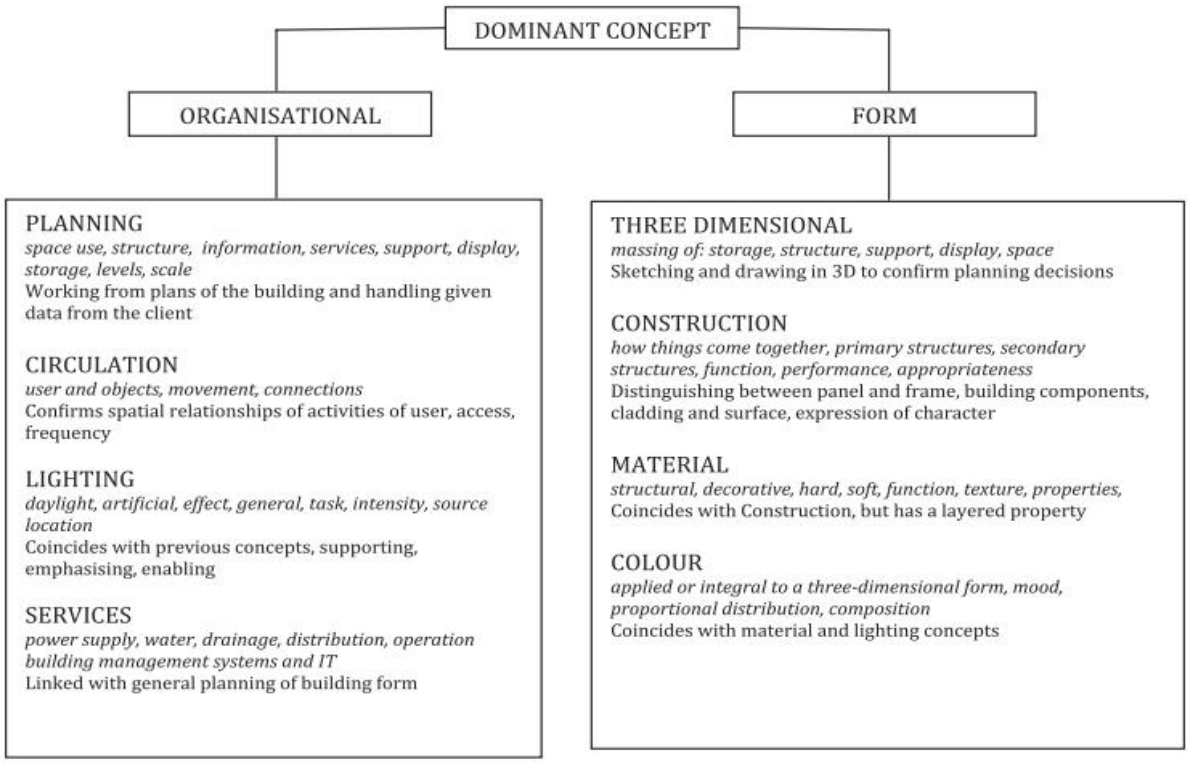
[15]Philip Plowright , *Revealing Architectural Design* (London, Routledge, 2014) p. 22.

[16]Anthony Sully, *Interior Design: Theory and Process* (London, A&C Black, 2012) p58.

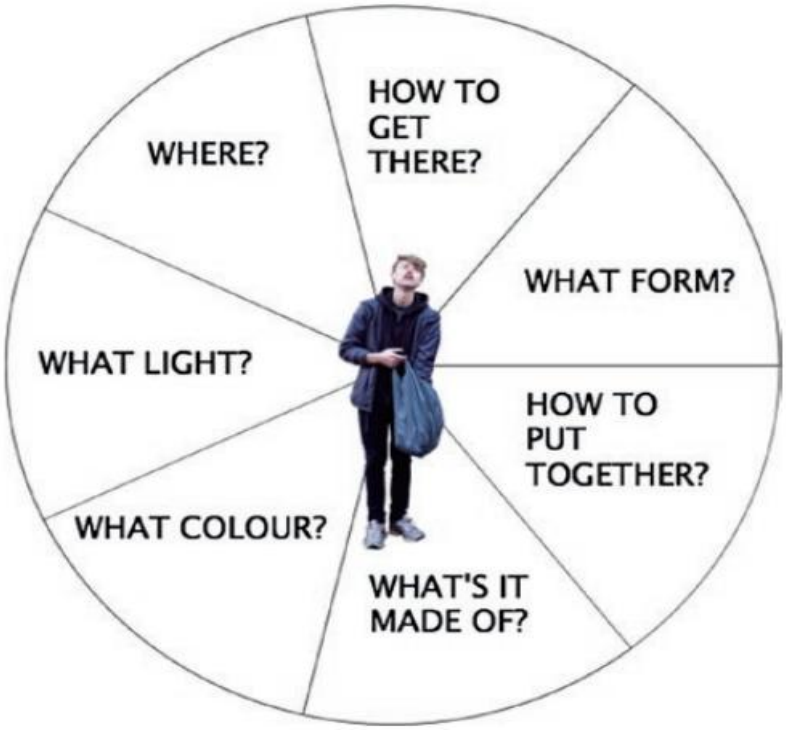
Eight Minor Design Concepts That Have to Be Developed into the Main Concept


DOMINANT CONCEPT
ORGANISATIONAL
FORM
PLANNING
space use, structure, information, services, support, display, storage, levels, scale
Working from plans of the building and handling given data from the client
CIRCULATION
user and objects, movement, connections
Confirms spatial relationships of activities of user, access, frequency
LIGHTING
daylight, artificial, effect, general, task, intensity, source location
Coincides with previous concepts, supporting, emphasising, enabling
SERVICES
power supply, water, drainage, distribution, operation building management systems and IT
Linked with general planning of building form
THREE DIMENSIONAL
massing of: storage, structure, support, display, space
Sketching and drawing in 3D to confirm planning decisions
CONSTRUCTION
how things come together, primary structures, secondary structures, function, performance, appropriateness
Distinguishing between panel and frame, building components, cladding and surface, expression of character
MATERIAL
structural, decorative, hard, soft, function, texture, properties,
Coincides with Construction, but has a layered property
COLOUR
applied or integral to a three-dimensional form, mood, proportional distribution, composition
Coincides with material and lighting concepts

A book has to be read in sequence of chapters, although the odd invasion to later ones can be spurred on by an urgent enquiry. So my sequence tends to acknowledge roughly when such concepts come to fruition in the way a designer works, although I do repeat that the design process is not a rigid sequence but instead responds to the designer's mood, client suggestion and the demands of the project. I shall not deal with the concept of building services as this has to rely upon the involvement of relevant engineers and that is beyond the scope of this book. Nevertheless, I would like to stress that the concept of building services can be a powerful influence on planning and the building form.

An item can fall within more than one conceptual heading. For example,
(it is assumed that a chair always accompanies a desk as a working partnership)

A desk has to be positioned which is the act of Planning.
A desk will be accessed by people—Circulation.
A desk is part of a suite of support systems which comes under Three Dimensions.
A desk will have a mode of Construction.
A desk is made of Materials.
A desk will have a certain Colour(S).
A desk will have to be lit by Lighting.



Concept Circle—Introductory diagram of the question posed by each concept. The reader should be able to match the above with each of the seven concepts listed

When looking at built interiors or the examples I provide in this book, sometimes it may not be easy to 'see' each one of these concepts clearly. I do not think that the purpose of designing should facilitate that anyway. A person may compliment an interior for the following common reasons:

- Good colour scheme
- Great lighting effects
- Great atmosphere
- Feels good working here
- Very comfortable
- Love the wood (or other materials for their dominating effect)
- It works very well
- Great place to meet people
- Great views

And conversely criticise the above for their negative aspects. The formation and implementation of these concepts is to aid the designer in his/her professional task of completing a major concept, which will emerge as the design proposal to the client. Each chapter deals with how that particular concept is approached, analysed and covered in order that a concept will emerge. There will not be an actual example of a concept at the end of each chapter because that can only emerge through a real design project. But I do provide an example in the appendix with a simple shopfront design. I would suggest that those concepts that can be 'seen' or determined by the user in order of clarity are as follows:

Colour must be the first impact and easily defined. The powerful and effect-making concept dependent upon the choice of Materials, Construction and Lighting. Colour and shade help define the 3D form. Capable of repair and maintenance.

Materials will impact on the viewer as much as colour, whilst being dependent upon Construction and homing in on the aesthetic and function of use. Competes with Colour for consideration as the chicken and egg scenario. Capable of repair and maintenance.

Lighting also runs parallel with the above two in visual recognition. Always the 'after' shows but undoubtedly brings everything to life. The only concept, apart from Circulation, that shifts in time and use. Capable of repair and maintenance.

Three Dimensions require more knowledge of the 'content' of the interior from every angle, which may not be possible. Taking off from the Planning and Circulation but seen in 3D. Beginning of visual judgement of space and form. Capable of readjustment.

Circulation can be experienced but only partially depending upon permissible access. People access and use of the space. Can dictate Planning as well as following. On a time and motion usage.

Construction much of this is unseen and therefore not able to be appreciated fully. Absorbing the Planning and 3D concepts into the reality of fitting and installation. How things come together. Capable of repair and maintenance.

Planning definitely requires a 'bird's eye view' which is hardly practicable. It is the act of 2D positioning and placement relative to people access and mental vision of 3D repercussions. The controlling fixed concept.

You could say that Planning and Three Dimensions are closely linked or that Materials, Construction and Colour are closely linked and of course they are. The purpose of this book is to prepare designers to focus on each concept independently as much as possible as functional items, whilst acknowledging relative connections without unwarranted influences of any one concept unfairly dictating a major influence. The overlapping nature of working can make independent analysis difficult. Here is Roberto Rengel's[17] suggestion of what a concept is:

A design concept aims to define appropriate responses that help generate a specific approach to solve a design problem… First, it is useful to divide interior design concepts into two broad categories: organizational concepts (the arrangement of space) *and character concepts* (those related to style, image or theme).

His organisational group relates to my concepts of Planning, 3D and Circulation, but he does not single them out in that way. His character concepts could include my concepts of Colour, Materials and Lighting, but again, he does not single them out. Construction is not mentioned.

A design concept is an expression of the key ideas with which the designer intends to work in order to generate a scheme.[18] **John Coles and Naomi House**

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[17]Roberto Rengel, *Shaping Interior Space* (New York, Fairchild Publications Inc. 2003) p. 122.

[18]John Coles and Naomi House, *The Fundamentals of Interior Architecture* (Switzerland, Ava Publishing 2007) p. 10.

Designers should always be aware of changes and developments that take place within the industry, which will have repercussions on the conceptual basis of working. For example, within the field of office design (other names such as space planning or office planning I consider to be superfluous), organisations are finding that the working methods are more group focused than personalised, and flexible workspaces are in demand. So designers are beginning to respond by designing reconfigurable spaces using transformative furniture facilitating easily accessible technology. This touches on my theory of 'Mechanics of Operation') MOO, of which there are examples shown in Chap. 4. This is based upon my belief that more moving parts are possible in interiors other than just doors and drawers.

This book is about that part of the design process called conceptual analysis. It is assumed that the site, location, building and orientation, as well as the client's brief of activities and needs, have been digested and analysed to provide the data upon which the design process can begin.

In this book, I refer occasionally to 'support systems' which covers anything that provides support for the human figure such as seating, beds, working surfaces, handrails as well as furniture storage and display forms.

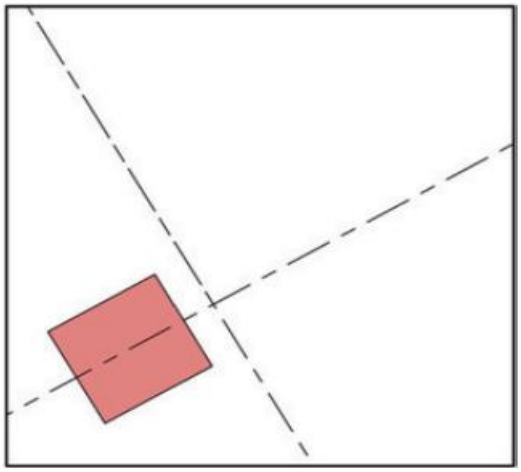
Movement

Movement of light, of pattern, of form and of people all help us to see and 'read' interior spaces. It is therefore absorbed by all concepts and is experienced through two ways:

1. As conceived and planned by the designer in the 3D rhythm of all constituent interior elements as seen by the user.
2. When people move throughout an interior, its static quality becomes liberated by the 3D motion of people movement and their awareness of the differentiation between form and space.

Chapter 1
Planning Concept

Abstract This chapter explains how the act of planning begins with the organisation of spatial areas linked by human circulation. Basic plan patterns are proposed together with the poverty of traditional plans. A dining layout is used as an example of a Support system, with tradition versus a more architectural solution. The act of drawing is explained from a basic dot and line to the use of grids. Why a person enters a space is answered and with suggested environmental aims. This is followed by relating the enclosure to a person's journey through the interior. Planning involves overlapping layers of support systems, wall enclosures and lighting. The beginnings of placement and positioning of objects are described. The major 3D planning elements are illustrated to acknowledge their role in planning.



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A. Sully, *Interior Design: Conceptual Basis*, DOI 10.1007/978-3-319-16474-8_1

1.1 Context: Organisation of Space, Enclosure and Support Systems—Keyword: Geometry

The plan is the generator—**Le Corbusier**[1]

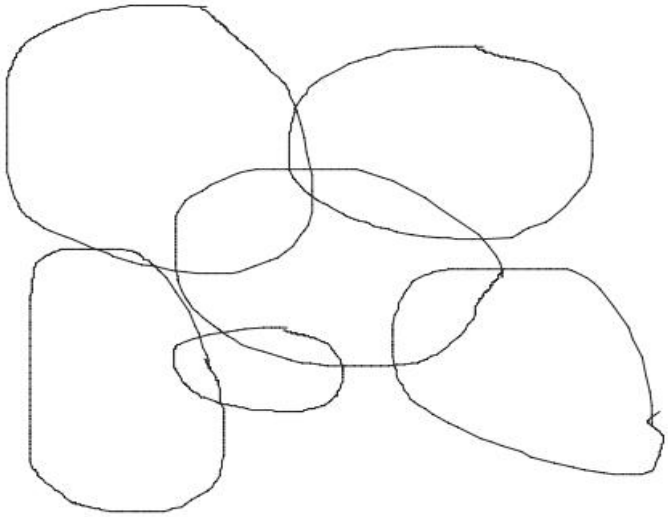
In Chap. 4 of my last book,[2] I dealt with geometry and how the growth of form began, and in Chap. 7, I describe a typical sequence of spaces that people can encounter when entering a building. I would now like to expand on this in more detail by focusing on planning and how it evolves as a design function. Remember that this is quite an advanced stage in the design process once research and analysis of the brief have been completed. From the brief, all the constituent spaces and activities, and the needs of the client have been established. The building's orientation, access and entry points for people and daylight have been analysed. It is now time to transfer or interpret this documentation into a series of diagrams and spatial analysis through drawing. It is very tempting to have preconceived ideas of what you could do in a space, but these should be dismissed to allow you to approach each project afresh. It is accepted that in many instances an interior designer works within a given building or on the planning of a new build. The following exercises assume that is the case but they concentrate on the growth of ideas irrespective of the building, at least for the time being. There are three stages in the planning process: (1) Bubble diagrams representing areas of activity and their relationships. (2) Overall planning strategy, structure and intended shape of space. (3) Planning by position interior secondary enclosures and support systems. The word 'room' does not appear at this stage as it is presumptive and too prejudicial. We will finally arrive at a planning concept prior to contributing to the overall design concept of the project in hand.

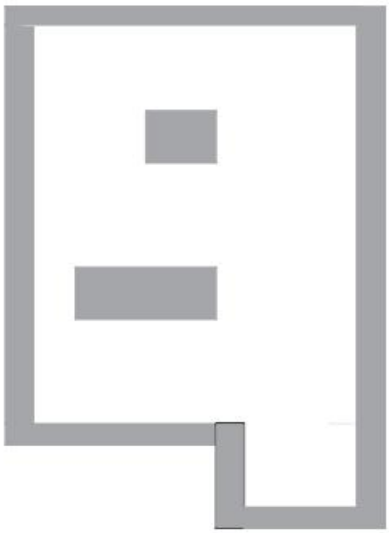
[1]Le Corbusier, *Towards a New Architecture*, (London, The Architectural Press, 1923).

[2]Anthony Sully, *Interior Design: Theory and Process* (London, A & C Black, 2012).

1.2 Stage 1—Bubble Diagrams

See Fig. 1.1.





Planning spaces/areas

An area is defined by the purpose of the space which is governed by the activities of the user. At this stage an approximate estimate of size is indicated.

These areas are described in terms of human circulation, services required and support systems (furniture etc). But these are not detailed or drawn as this is the next stage in the planning process.

We are concerned about spatial relationships in relation to the building enclosure. How people move from one space to another, and what specific links the spaces have to one another.

Planning objects in relation to enclosure

Once spatial relationships have been decided it is now time to work from building plans to assess how those areas fit into the building.

Adjustments to these relationships may have to be made in response to the exigencies and constraints of the building.

The support systems will consist of those items that are attached to the building shell, and tbose items that are freestanding.

Fig. 1.1 Bubble diag

1.3 Stage 2—Overall Planning Structure

The building system will affect the way in which he, as an organism, works systematically in so far as it leads to the stimulation of his various senses separately—seeing, hearing, smell, heat and cold, kinaesthetic, equilibrium, and determines his physical relationships with other people in terms of room size and shape, furniture arrangements, circulation patterns and other means of communication.[3] **Geoffrey Broadbent**, ***Design in Architecture*** **1973**

The second stage in the planning process is to develop an overall strategy or structure that all components of the plan hang on. It is very dangerous and presumptive to impose a planning discipline before the details of stages two and three have been given an airing. The important point to stress here is that the design process is organic in the way that it grows from small bits of information. Before I examine this stage, let me describe one of the collective thoughts that a designer is always conscious of: people entering and using the spaces to be designed either on a prescribed pathway or a pathway of choice (Fig. 1.2).

If you want to foresee from a plan some of the things that might eventually occur in a built environment, you must be able to imagine how different people using it will react to its various parts.[4] **John Zeisel**

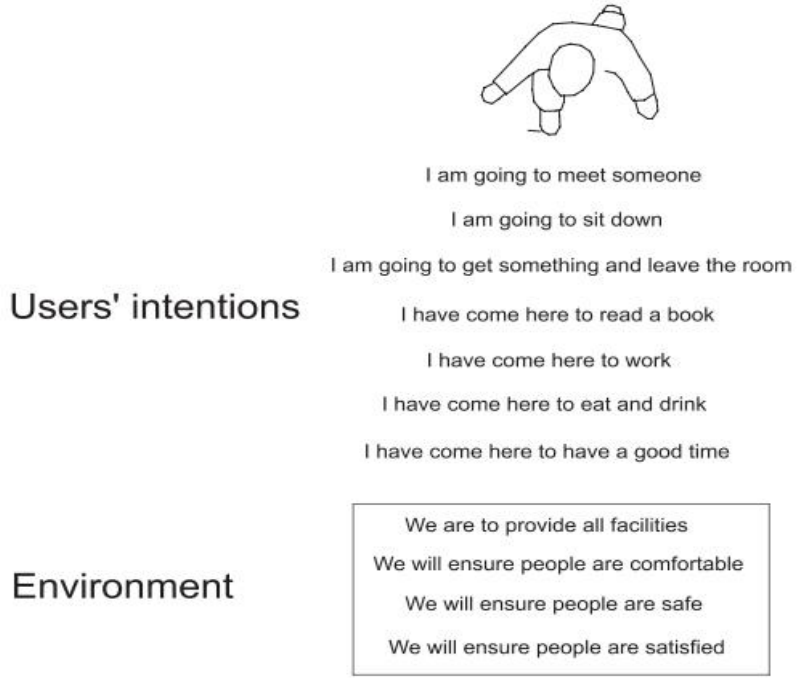

I am going to meet someone
I am going to sit down
I am going to get something and leave the room
Users' intentions
I have come here to read a book
I have come here to work
I have come here to eat and drink
I have come here to have a good time
We are to provide all facilities
We will ensure people are comfortable
Environment
We will ensure people are safe
We will ensure people are satisfied

Fig. 1.2 User's intentions and environmental response

[3]Geoffrey Broadbent, *Design in Architecture,* (London, John Wiley & Sons, 1973) p. 386.

[4]John Zeisel, *Inquiry by Design,* (Cambridge, Cambridge University Press, 1981) p. 222.

Of course there are many more countless reasons for entering a space and these will be governed by the function of the interior and the building. This example may seem simple and obvious but I suggest to any designer to write down such statements on a current project and see if this enlightens you or your approach to your project.

User's intentions: There are multitude reasons why people use interiors, and this is an example of an imagined approach that the user may have. It acts as a guide to making design decisions.

Environment: This stands for the interior that you are designing and can act as a reminder of the purpose of the project.

1.3.1 Plan Patterns

The following are generic and will be extended or varied according to a specific interior.

Needs of the user	Environment/Enclosure provision
Decisions and choices have to be made—where to go, what to do and how to get there	Good access
Clarity of vision	Building services and IT
Good lighting in order to accomplish task	Telecommunications
Easy and unobstructed circulation	Good lighting
Horizontal surfaces of required size	Good fenestration
Vertical surfaces for possible communications	Appropriate finishes
Adequate storage	Health and safety measures
Comfort	Provision of toilet and kitchen as required
Adequate support systems	Good acoustics
An interior that uplifts the soul	Appropriate spatial divisions
An interior that gives satisfaction	Appropriate space for circulation
An interior that is welcoming	Appropriate space for carrying out tasks
An interior that works according to the brief	Appropriate support systems

The following plan patterns are the beginning of establishing an individual circulation structure using the information gathered from the table above. Although circulation, which is the flow of people performing their various tasks, is a concept to be developed in Chap. 2, it is part of planning as an overlap of concepts, which was explained in the Introduction. On the one hand, the needs of the user are determined and these will suggest formal solutions for planning which will begin with describing the area required for the activities to take place. This is carried out in each area, which will confirm relationships of these areas. This is followed by a more detailed search for solutions regarding support systems and building components for dividing space. I repeat what I said in my last book that planning is not totally a two-dimensional exercise, as the designer is thinking in three dimensions whilst planning. Three-dimensional sketches should be drawn at the same time simply to confirm the thought processes and for reassurance. The following diagrams are simple starting examples (Figs. 1.3 and 1.4).

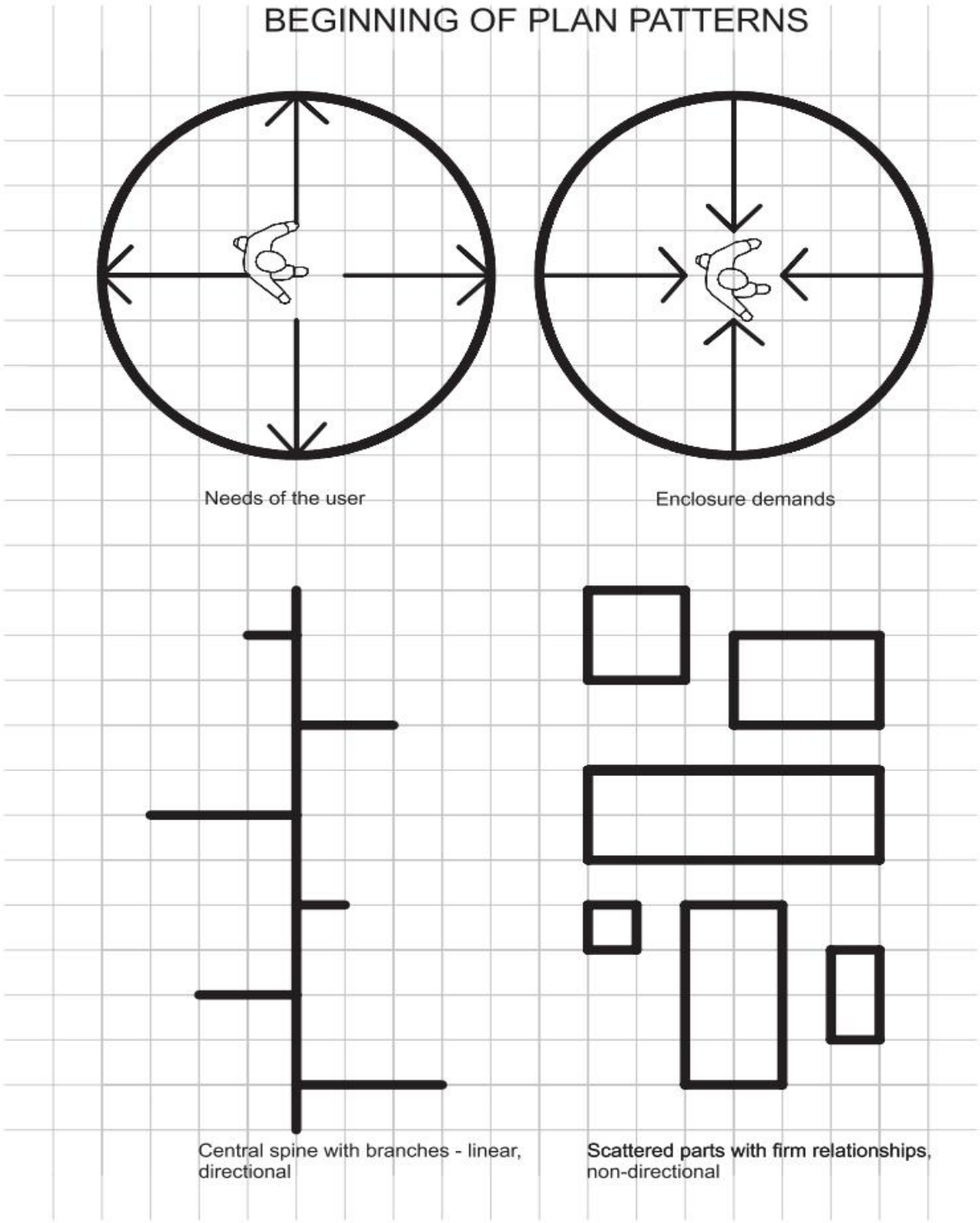

BEGINNING OF PLAN PATTERNS
Needs of the user
Enclosure demands
Central spine with branches - linear, directional
Scattered parts with firm relationships, non-directional

Fig. 1.3 Beginning of plan patterns

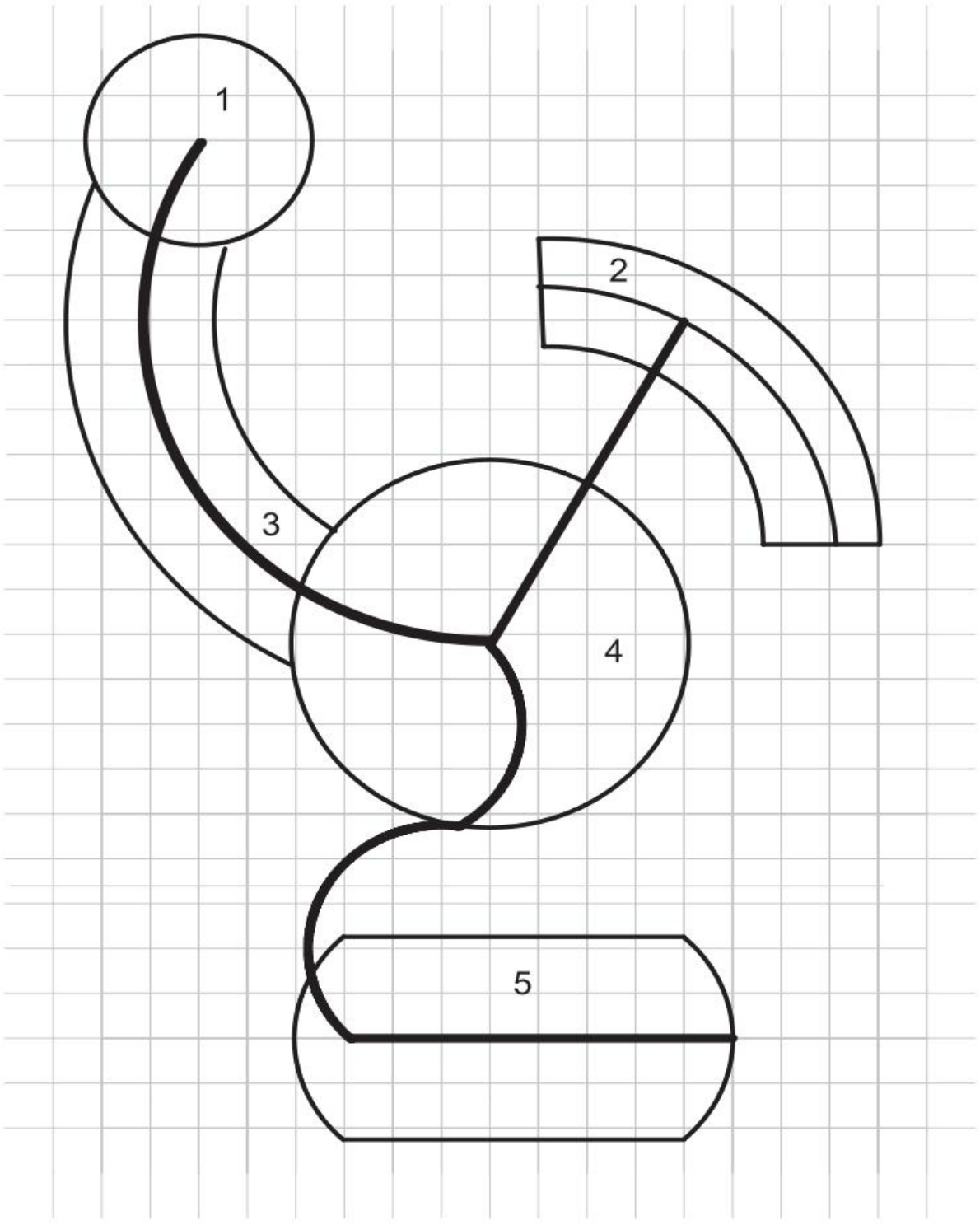


Fig. 1.4 Irregular curved spine or axis leading to areas of activity 1, 2, 3, 4 and 5

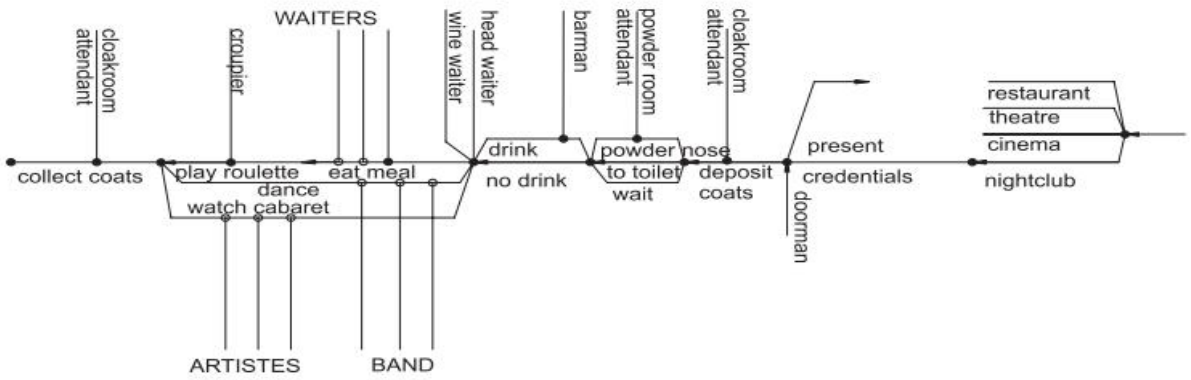


Fig. 1.5 Broadbent activity chart for nightclub

The axis in these diagrams is indicative of human circulation providing routes of access between the areas of activity.

In his book 'Design in Architecture',[5] Geoffrey Broadbent provides an example of an activity and movement analysis chart based upon a couple entering a nightclub as shown below. From this, a complex pattern of interacting flow charts would be built up. This is not spatial planning as discussed previously, but shows an analytical approach towards organising data that have been collected from the brief (Fig. 1.5).

1.3.2 Interior Plan Examples

From Bubble Diagrams, we move to a building to ascertain how these can fit into the spaces provided. If we look at two typical plans in Fig. 1.6, one of an office and one of a lounge, we can see how limited these plans are in terms of any sort of imaginative input with regard to a pattern of structure. They are traditional and yet are very common to see in many installations. To the trained designer, the furniture forms shown below are so familiar that they do not need labelling, which in itself is a sad reflection on how conventional schemes can be. Both of these plans when realised in built form could have hundreds of different decorative schemes and furniture from different manufacturers, never mind the variations in lighting. So, even though the plans are traditional, the finished interiors can provoke a pleasurable response from the clients, and this is the point I am making: is a plan that does not generate any energy or give any clue as to the finished interior, a substandard one? One problem is that these plans denote the components of the building and furniture by well used symbols that have become recognised such as a door opening, a chair, etc., and subsequently fail to communicate any design intensity or originality.

Now if we look at the plan of this house in Fig. 1.7, we can see how organic and responsive to the site the design is. Each space has a purposeful form rather than being swamped by the over-riding rectilinear grid of the examples above.

[5]Geoffrey Broadbent, *Design in Architecture* (London, John Wiley & Sons, 1973) p. 394.

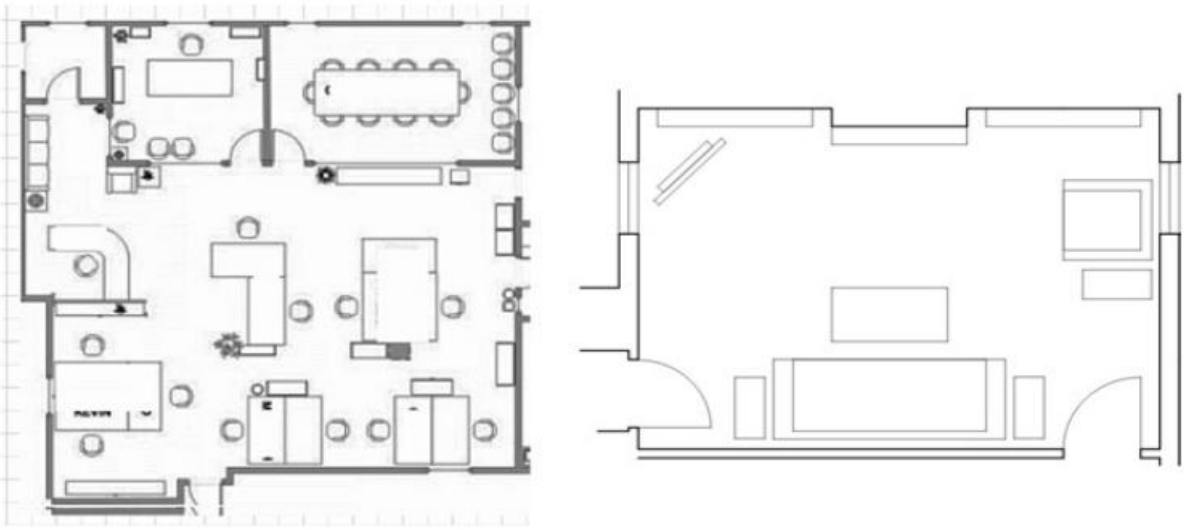


Fig. 1.6 Plans of a typical office and a lounge

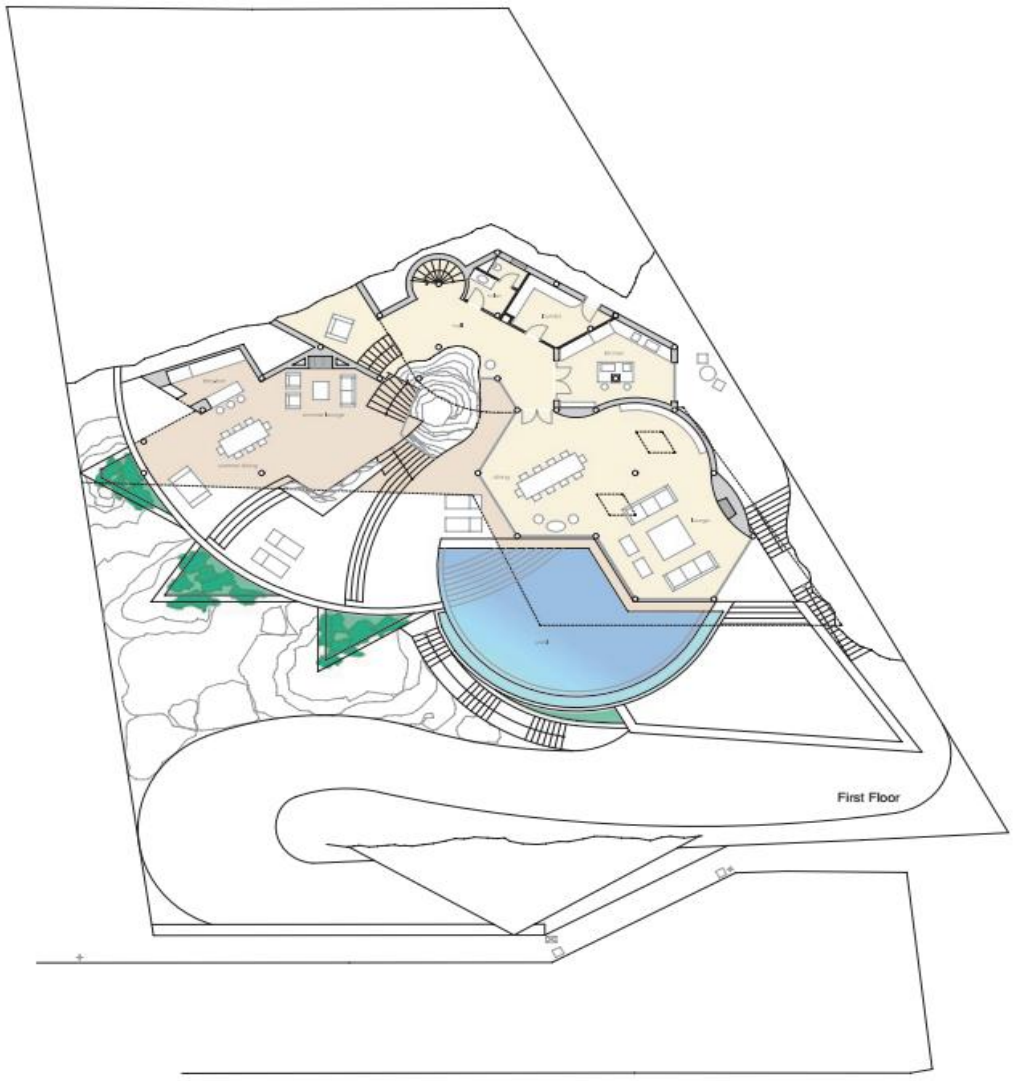


Fig. 1.7 Plan of Rock Star Villa, Majorca by Alberto Rubio, 2013

1.4 Stage 3—Interior Divisions/Support Systems

1.4.1 Furniture/Support System Example

Figure 1.8 shows a conventional formal domestic layout of a dining table and loose chairs for 8 people, which, whilst it is so common and acceptable, has no architectural integrity with a building but is a stand-alone setting. A circular table for eight people (shown in red) would make each person of equal status but it occupies more space in one dimension and hence is less common.

If we examine further this traditional layout for 8 people in Fig. 1.9, it is interesting to see the imbalance of each sitting position. The rectangular table is the

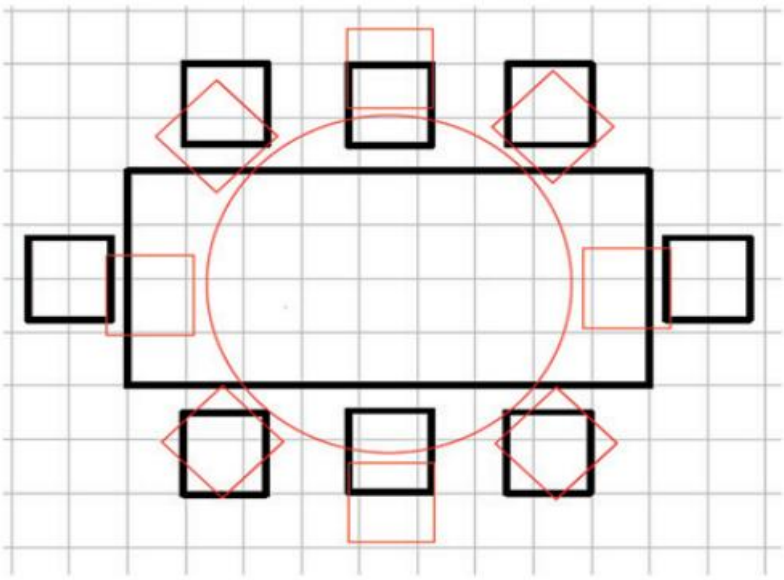


Fig. 1.8 Plan of dining layout for 8 people. Drawings by the author

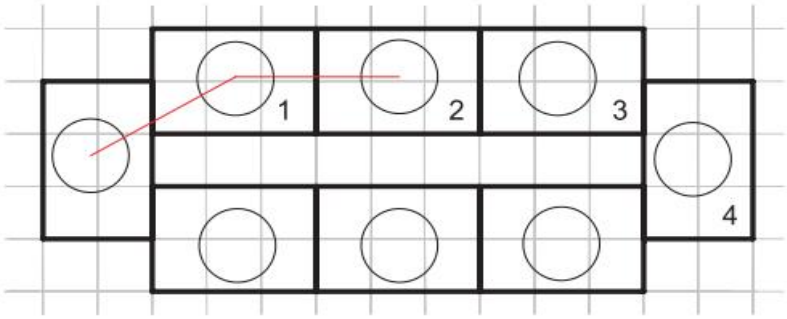


Fig. 1.9 Analysis of diners' relationships

most common form that is used. The red line confirms all places (600 × 400 mm) are equidistant each other so no unevenness there. The end places denoted by 4 are usually the 'top table' hosts of the evening but have limited conversational contact with the two nearest places (2 × 3 or 2 × 1). Place No. 1 has contact with four places, and place No. 2 has contact with five places. Social mores being what they are, the kind of people sitting (hosts already established) would be the most entertaining seated at 2, the most boring at 1 and 3. This is of course very mean and unkind of me but there is a grain of truth in what I say. Alternatively, the hosts may position potential mating singles opposite each other (side by side no good for flirting!) as in 1 or 3. The point I am making is that the relationship of people with each other is an important consideration in all interiors. The design problem here is not just to design a dinner table and 8 chairs by exploring materials, colours, textures and structure. It is to understand human relationships and these can be extracted from the brief of the particular location concerned.

I have drawn the plan in Fig. 1.10 and a 3D sketch in Fig. 1.11 of an unconventional dining situation, which is more of an architectural solution because all components bind together in a spatial relatedness. Bear in mind that, as I said in the beginning of this book, all ideas discussed are independent from any building unless otherwise stated.

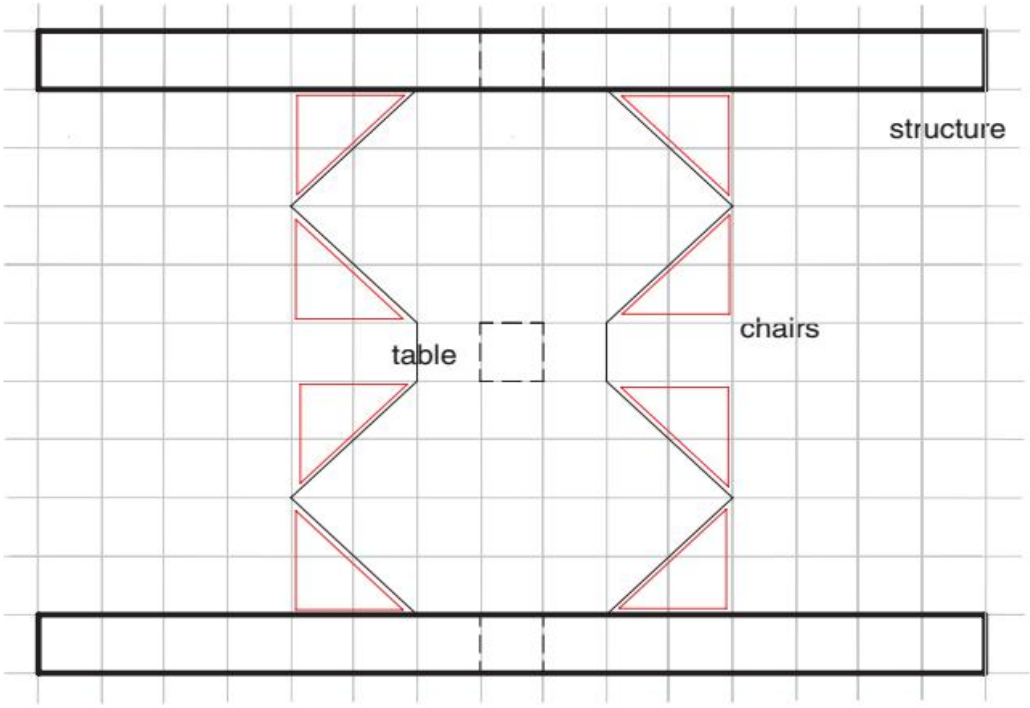


Fig. 1.10 Proposed dining plan for 8 people

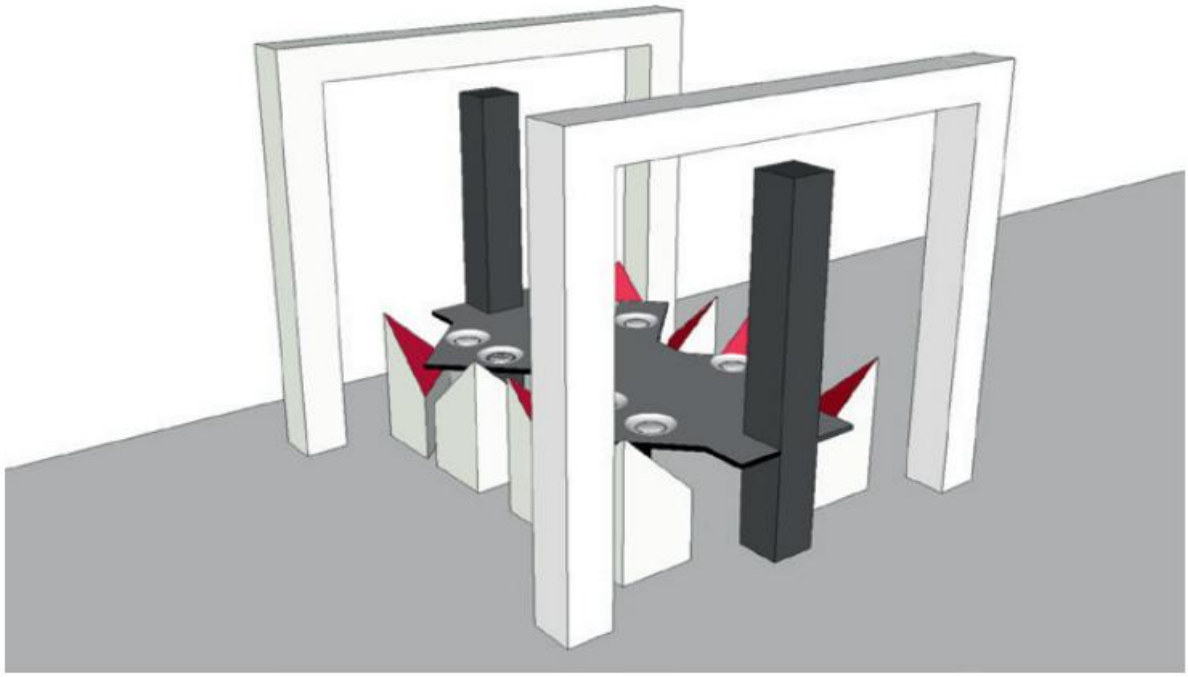


Fig. 1.11 3D sketch of unconventional dining layout in Fig. 1.10. The *black* columns, whilst supporting the table surface, are sharing the enclosing structure function with the *white* frames. They could both support lighting. Drawings by the author

1.4.2 Division/Door Opening

The top plan drawing in Fig. 1.12 illustrates a basic door access within a partition and the operational action involved. The upper plan drawing in Fig. 1.13 explains how a straight partition can be conceived as being made up of modular units even though they may not be expressed visually. The lower plan shows how the modular units can be expressed with a radical staggering of each unit with an opening providing access. The plan in Fig. 1.14 of the Vortex Centre shows how the external walls and internal partitions are not only curved but also they are staggered to achieve a tapering of the whole plan. The elevation in Fig. 1.15 shows this clearly but flattens the 3D view. We are so used to seeing or expecting an elevation to show a flat wall at 90° to the viewpoint simply because the majority of buildings that exist are of a rectilinear format. Today, we are confronted by exceptional examples of a fluid geometry and hence the elevations will seem slightly odd because of the flattening rule of elevational drawing.

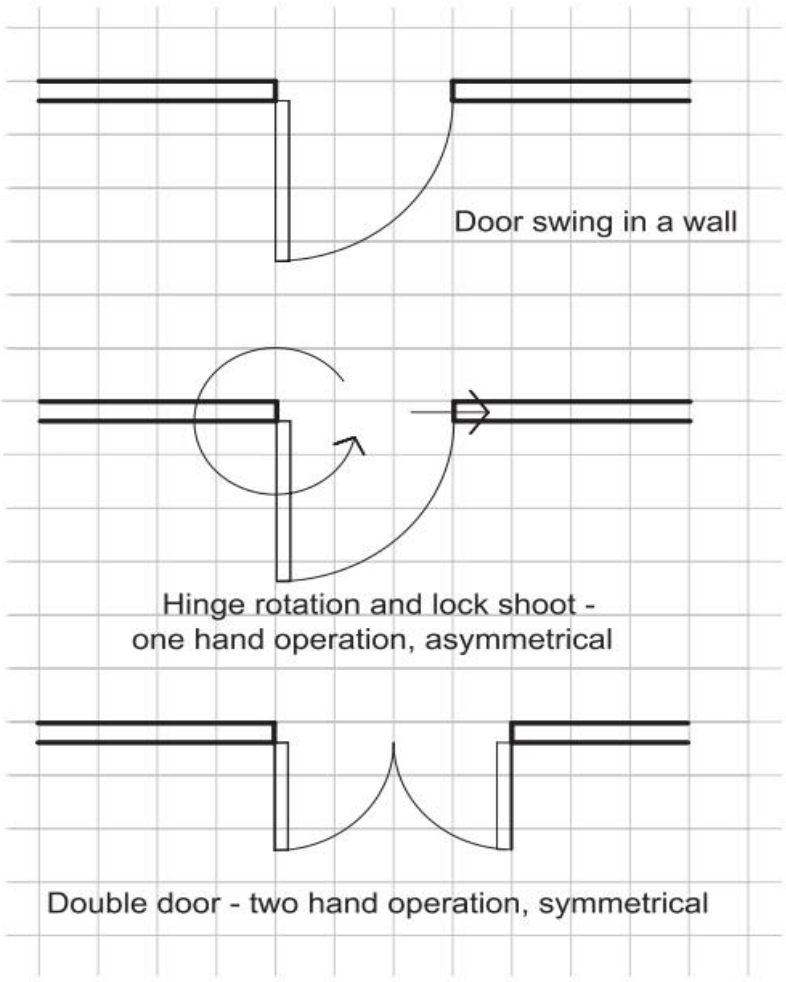

Door swing in a wall
Hinge rotation and lock shoot -
one hand operation, asymmetrical
Double door - two hand operation, symmetrical

Fig. 1.12 Door opening

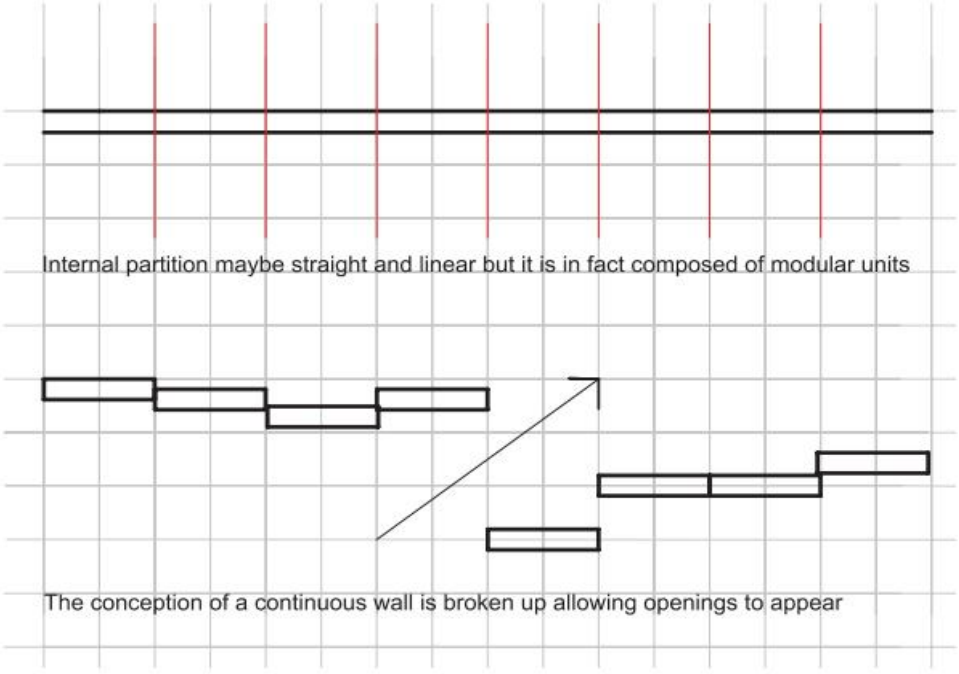

Internal partition maybe straight and linear but it is in fact composed of modular units
The conception of a continuous wall is broken up allowing openings to appear

Fig. 1.13 Modularised partition

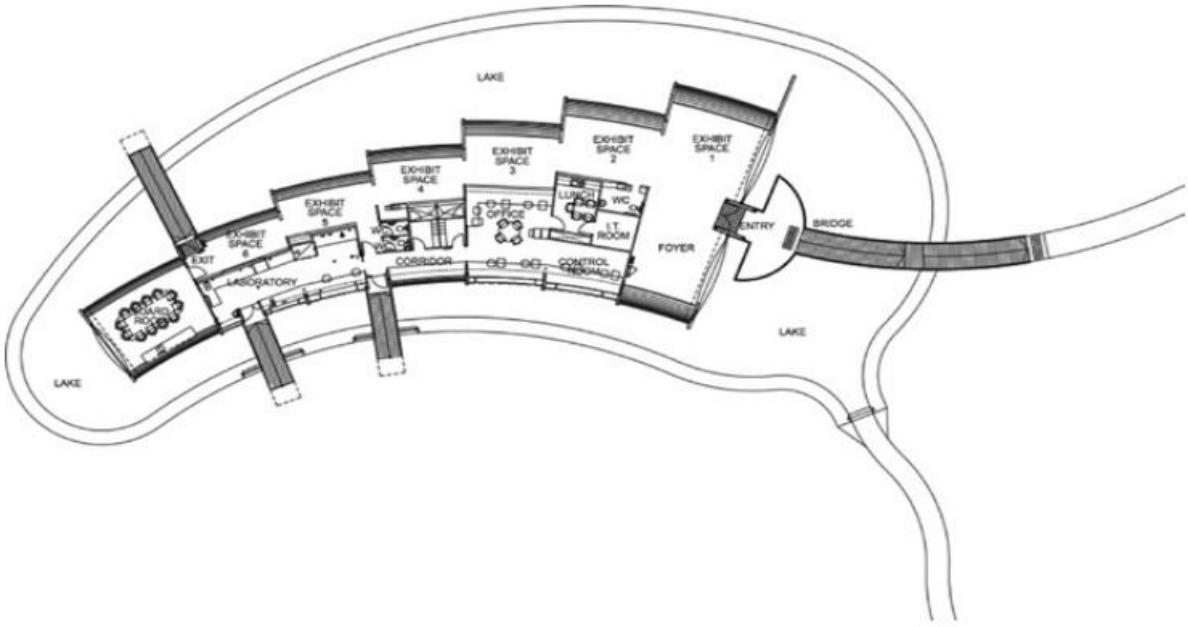


Fig. 1.14 Plan drawing of the Vortex Centre of the Gippsland Water Factory, Victoria, Australia. Designed by DesignInc of Melbourne, 2010

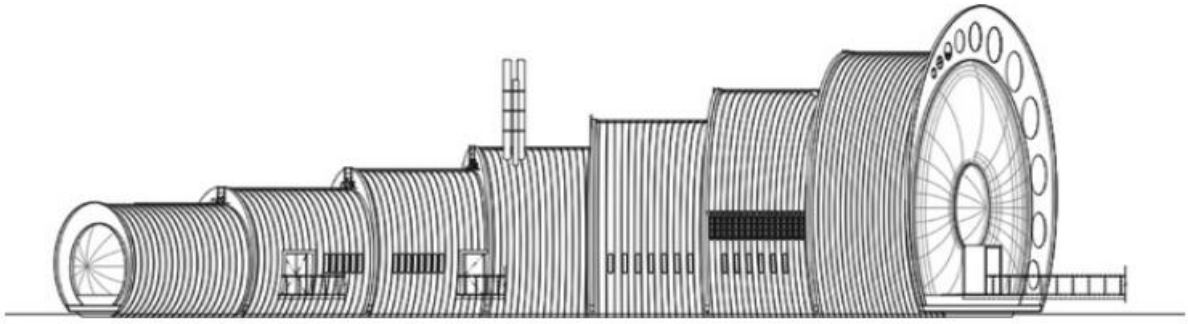


Fig. 1.15 Vortex Centre, external elevation drawing

1.5 Drawing—The Starting off Point

Planning involves the organisation of space, enclosure and support systems from a set of briefing requirements that will suggest location. The starting off point begins with the pencil drawing from a dot to a line and positioning. The first few marks made on paper are quite daunting. Faced with a blank canvas, a start has to be made somewhere. As indicated in Figs. 1.16 and 1.17, do you start from the centre or the edge? The lines drawn will either represent additional internal divisions (partitions) or support systems of furniture and generally floor-mounted products. But, apart from the planning of items, the plan drawing can act as a visual notebook which are shown as examples in Figs. 1.18 and 1.19.

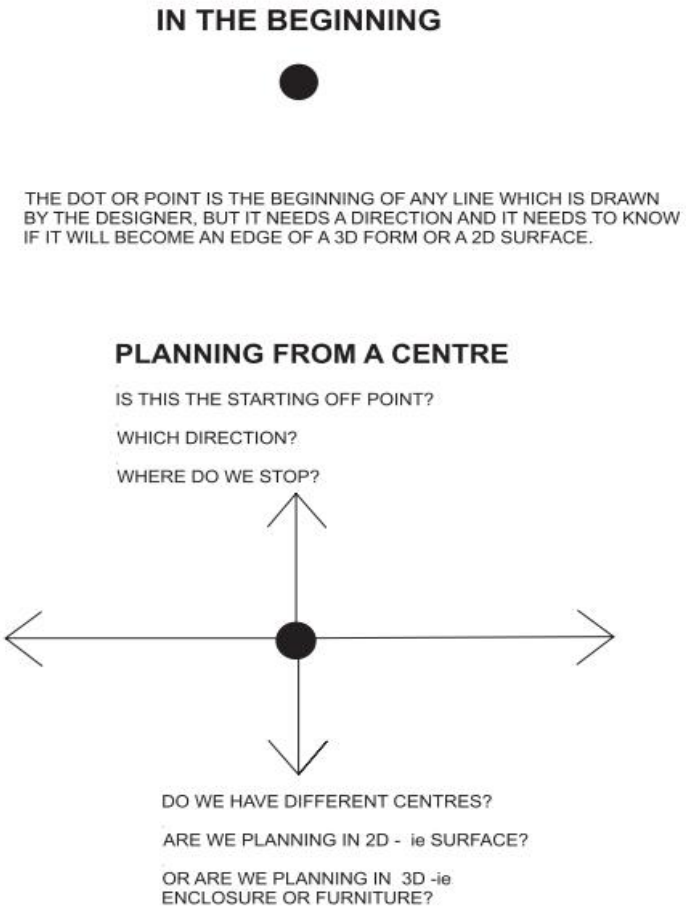

IN THE BEGINNING
THE DOT OR POINT IS THE BEGINNING OF ANY LINE WHICH IS DRAWN BY THE DESIGNER, BUT IT NEEDS A DIRECTION AND IT NEEDS TO KNOW IF IT WILL BECOME AN EDGE OF A 3D FORM OR A 2D SURFACE.
PLANNING FROM A CENTRE
IS THIS THE STARTING OFF POINT?
WHICH DIRECTION?
WHERE DO WE STOP?
DO WE HAVE DIFFERENT CENTRES?
ARE WE PLANNING IN 2D - ie SURFACE?
OR ARE WE PLANNING IN 3D -ie ENCLOSURE OR FURNITURE?

Fig. 1.16 In the beginning

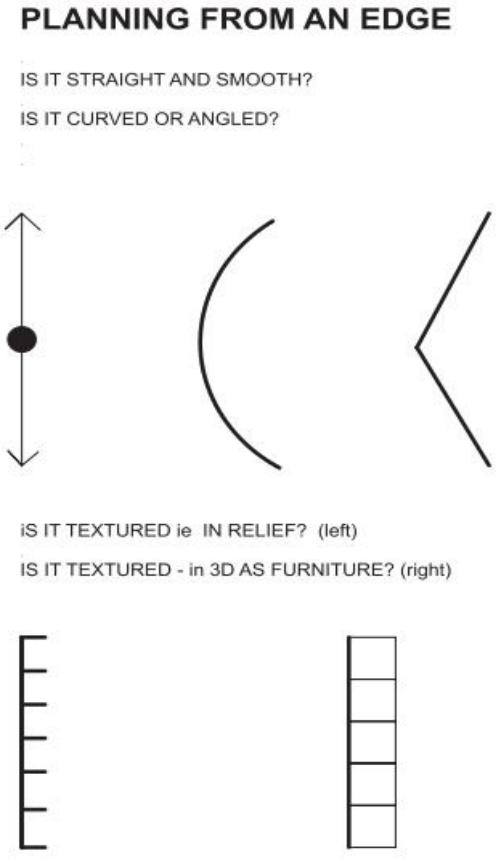

PLANNING FROM AN EDGE
IS IT STRAIGHT AND SMOOTH?
IS IT CURVED OR ANGLED?
iS IT TEXTURED ie IN RELIEF? (left)
IS IT TEXTURED - in 3D AS FURNITURE? (right)

Fig. 1.17 Planning from an edge

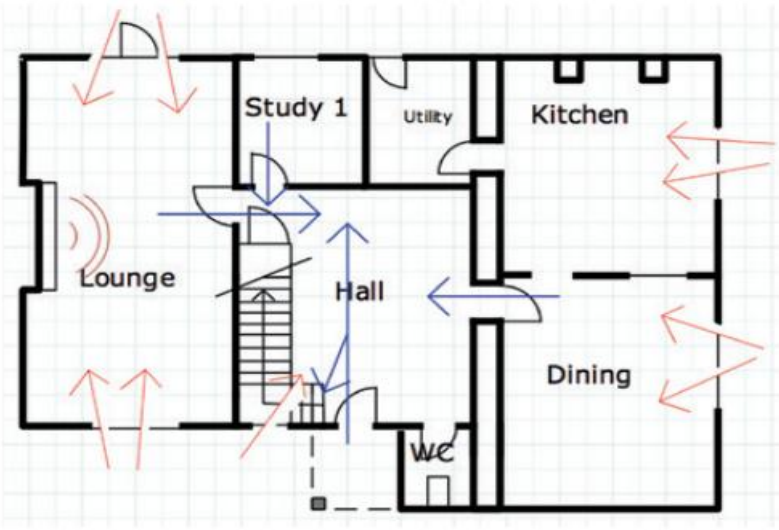


Fig. 1.18 House plan notations to be interadapted (see Chap. 4, Sect. 4.3). *Red arrows* indicate daylight entry and *blue arrows* indicate key circulation routes. Drawn by author

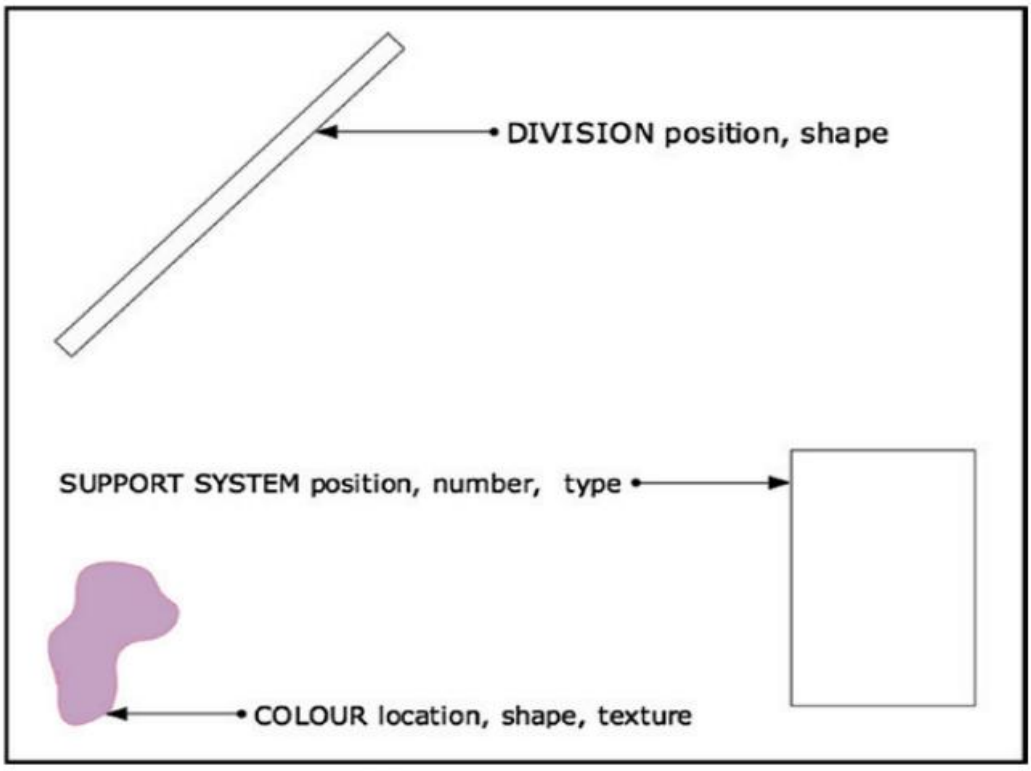


Fig. 1.19 Showing the decisions having to be made regarding position of divisions and support systems which are leading subjects, and colour, which we will come to in Chap. 6, can also influence planning decisions

1.5.1 Grids

The grid is an essential means of planning building and furniture support systems. It is never dictatorial but rather affords the designer the control necessary to be able to position components in respect of human circulation and user requirements. Here are some examples in Fig. 1.20 using the square, diagonal and circle.

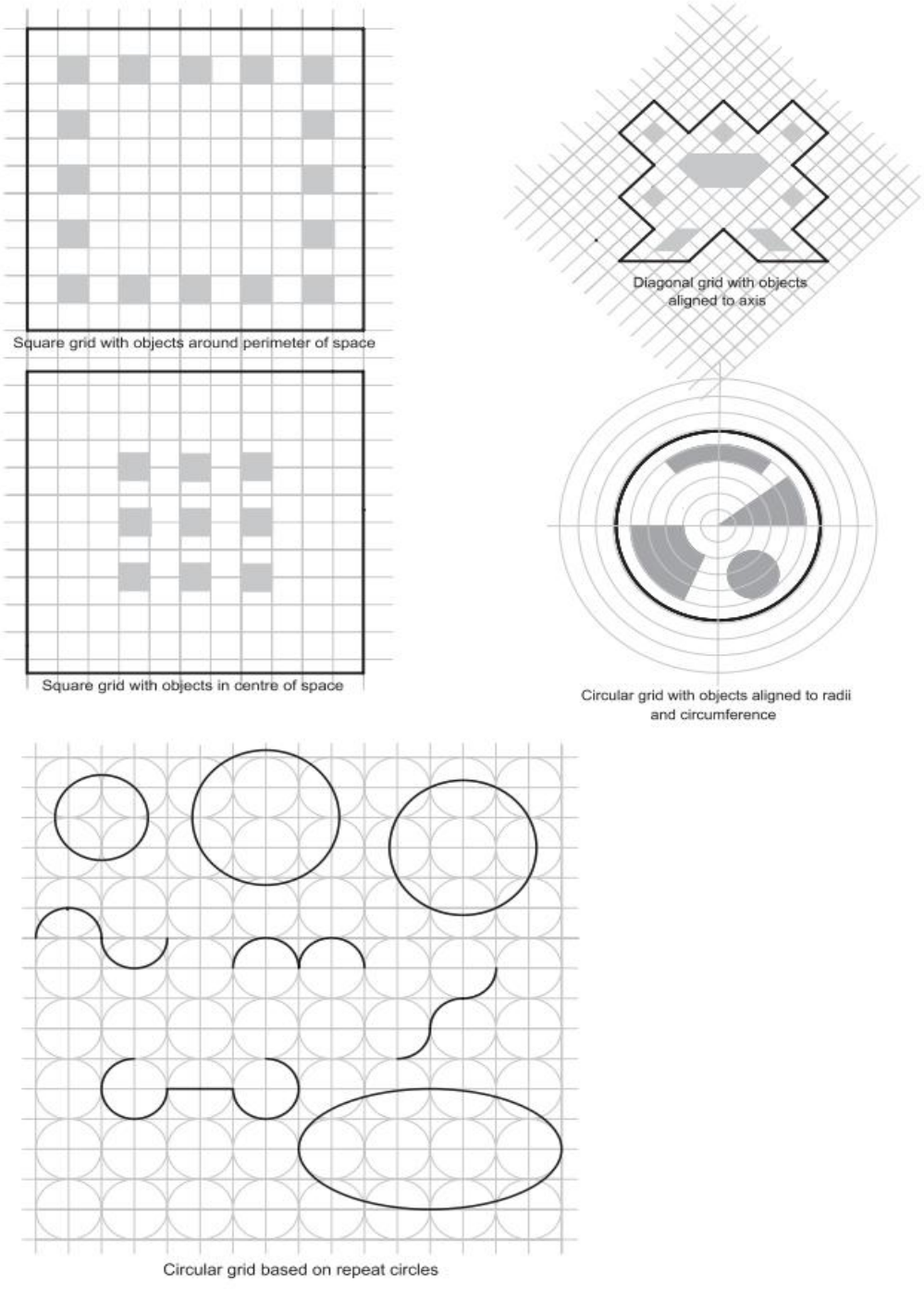

Square grid with objects around perimeter of space
Diagonal grid with objects aligned to axis
Square grid with objects in centre of space
Circular grid with objects aligned to radii and circumference
Circular grid based on repeat circles

Fig. 1.20 Grids

1.6 Enclosure and Journey

The journey is the pathway or route that follows a particular direction towards a destination (Fig. 1.21). The Porsch Pavilion in Case Study 1 shows the main spaces of Entrance, Threshold which is the inbetween stage, Reception where visitors are greeted and Main Activity where the display and messages are made (Fig. 1.22).

While it is entirely possible for a pathway to be a clear and easily comprehensible totality, it is more usual for it to be experienced sequentially, marked by distinct focal points.[6] **Malnar and Vodvarka**

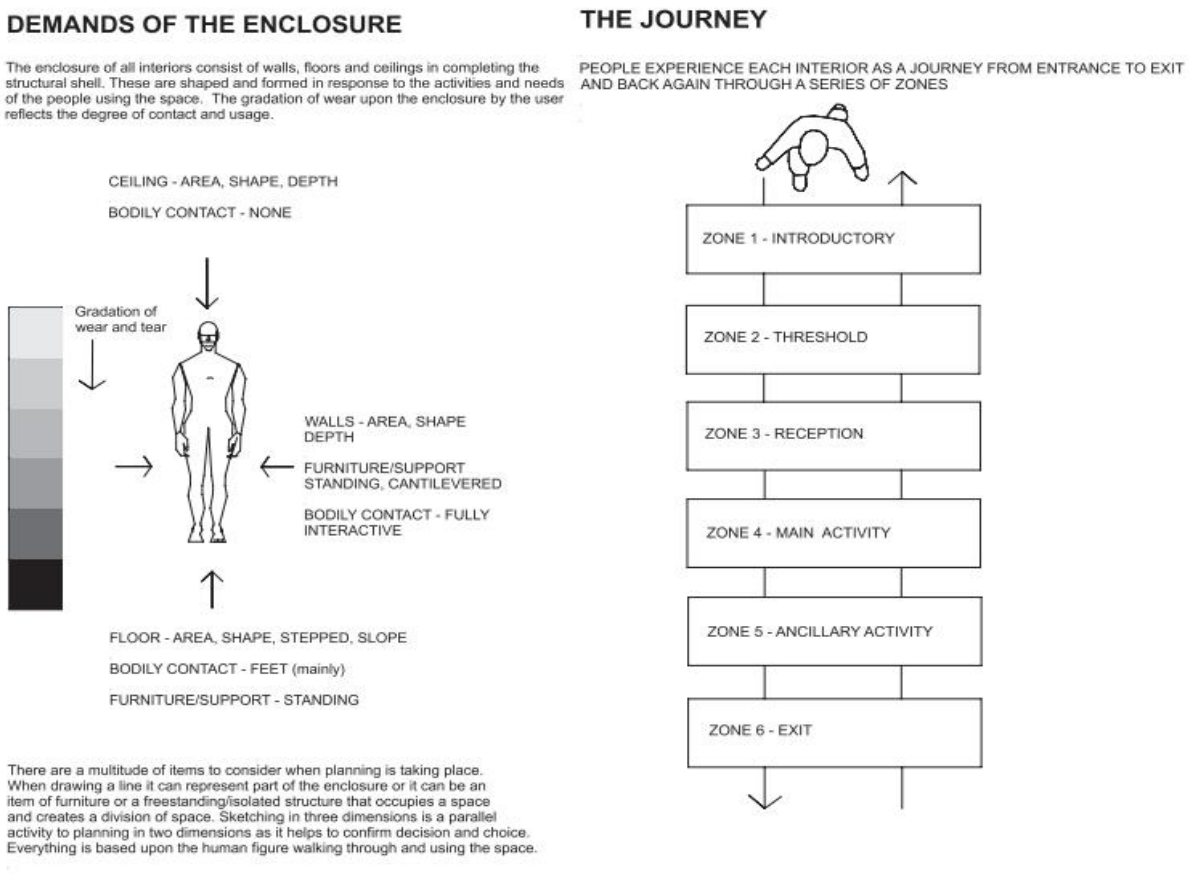

DEMANDS OF THE ENCLOSURE
The enclosure of all interiors consist of walls, floors and ceilings in completing the structural shell. These are shaped and formed in response to the activities and needs of the people using the space. The gradation of wear upon the enclosure by the user reflects the degree of contact and usage.
CEILING - AREA, SHAPE, DEPTH
BODILY CONTACT - NONE
Gradation of wear and tear
WALLS - AREA, SHAPE DEPTH
FURNITURE/SUPPORT STANDING, CANTILEVERED
BODILY CONTACT - FULLY INTERACTIVE
FLOOR - AREA, SHAPE, STEPPED, SLOPE
BODILY CONTACT - FEET (mainly)
FURNITURE/SUPPORT - STANDING
There are a multitude of items to consider when planning is taking place. When drawing a line it can represent part of the enclosure or it can be an item of furniture or a freestanding/isolated structure that occupies a space and creates a division of space. Sketching in three dimensions is a parallel activity to planning in two dimensions as it helps to confirm decision and choice. Everything is based upon the human figure walking through and using the space.
THE JOURNEY
PEOPLE EXPERIENCE EACH INTERIOR AS A JOURNEY FROM ENTRANCE TO EXIT AND BACK AGAIN THROUGH A SERIES OF ZONES
ZONE 1 - INTRODUCTORY
ZONE 2 - THRESHOLD
ZONE 3 - RECEPTION
ZONE 4 - MAIN ACTIVITY
ZONE 5 - ANCILLARY ACTIVITY
ZONE 6 - EXIT

Fig. 1.21 Enclosure and journey

[6]Malnar and Vodvarka, *The Interior Dimension* (New York, Van Nostrand Reinhold, 1992) p. 246.

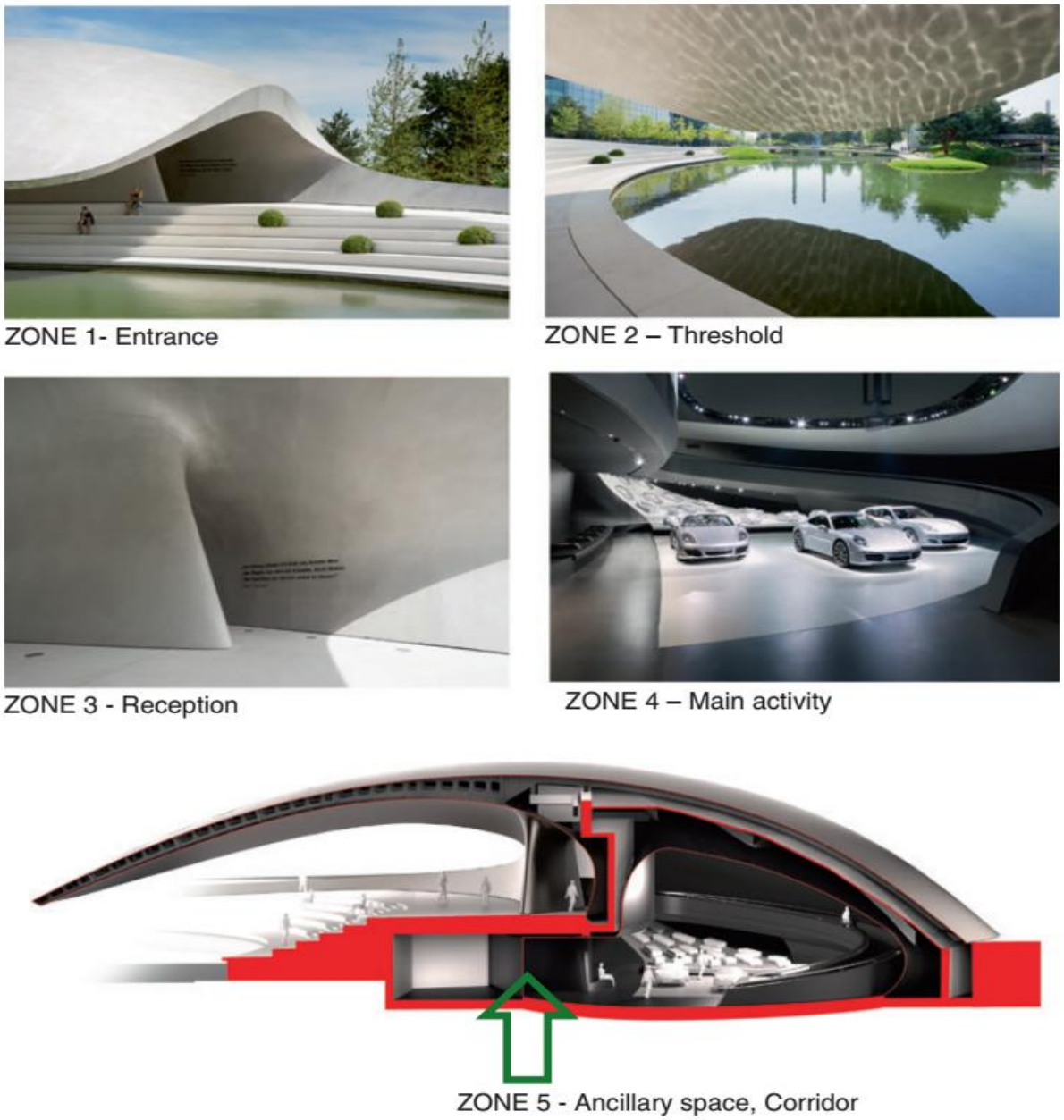


Fig. 1.22 Porsche Pavilion at the Autostadt in Wolfsburg, 2012. Architects: HENN

1.7 Case Study 1—The Journey

Remarkably, how these recliners would suit the Porsche Pavilion's lake. See Sect. 1.9 for planning of loose items (Fig. 1.23).

Fig. 1.23 Recliners designed by EOOS from Austria and made in the Philippines by Dedon 2012. The frame is of powder-coated aluminium tube, and the weave is 'Dedon Fibre' a synthetic high density extruded polyethylene

1.8 Layers

Planning is a multitask activity involving three main layers of physical content: structure (denoting walls and floor), furniture/support systems (attached to walls and floor) and ceiling (denoting lighting and other services). The diagram in Fig. 1.24 is intended to show the layers of these three items but not related to a specific interior. Ceiling Plane—yellow, Furniture Plane—brown and Structural Plane—black.

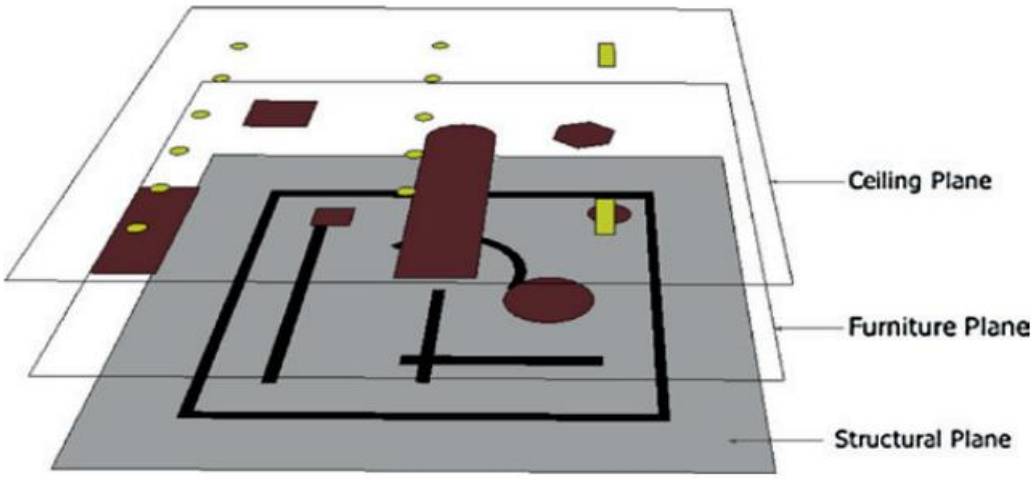


Fig. 1.24 Diagram of layers

Just as plan and section should be considered together, both the fundamental planning considerations we have discussed—the determination of limits and the accommodation of physical and psychological function—should occupy the designer's mind simultaneously, for they are two coexistent problems that demand a single solution. It is best that the size, shape and character of a plan not be determined serially, with practical limits first dictating size and shape, and with subjective responses to imagined function later dictating character, but that all be determined together, for character is not separable from physical form but is governed by it.[7] **Stanley Abercrombie**

The act of drawing whilst planning is not a two-dimensional activity. It may appear to be so because the paper (or screen) is two-dimensional but the drawing being created represents a three-dimensional object. It is normal practice on a drawing board (or computer screen) to draw the floor/structural plane first and place layers of tracing paper over to work out the other two planes of furniture and ceiling elements. Other layers can be drawn to represent circulation of people and consideration of services. These layers also exist on the computer screen. Of course when the scheme is finalised, horizontal cross sections can be drawn which show all components of the object, and these are very different from the energising diagrammatic layers illustrated above.

The whole planning process can be complicated because of the overlapping nature of these layers and other factors. Therefore, a certain amount of discipline has to be employed by the designer in order to maintain a clear understanding of the problem. It is rather like cooking whereby various ingredients are selected, accumulated and prepared separately before being mixed together to produce the final dish. As demonstrated in my last book, a dimensional grid is essential for positioning and placement.

[7]Stanley Abercrombie, *A Philosophy of Interior Design* (New York, Harper and Row, 1990) p. 26.

1.9 Placement of Object—Orientation and Positioning

See Figs. 1.25 and 1.26.

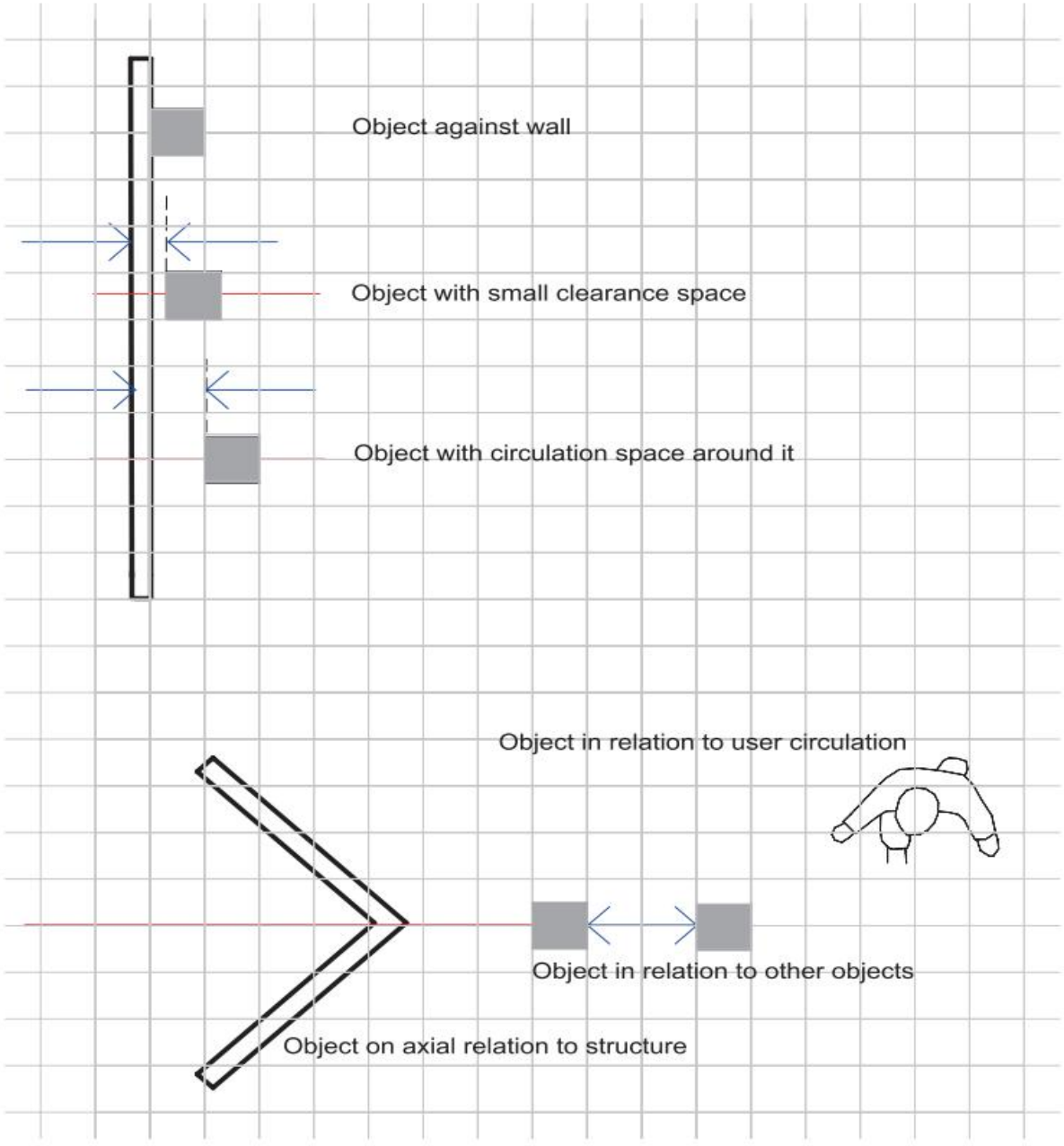

Object against wall
Object with small clearance space
Object with circulation space around it
Object in relation to user circulation
Object in relation to other objects
Object on axial relation to structure

Fig. 1.25 Placement of object

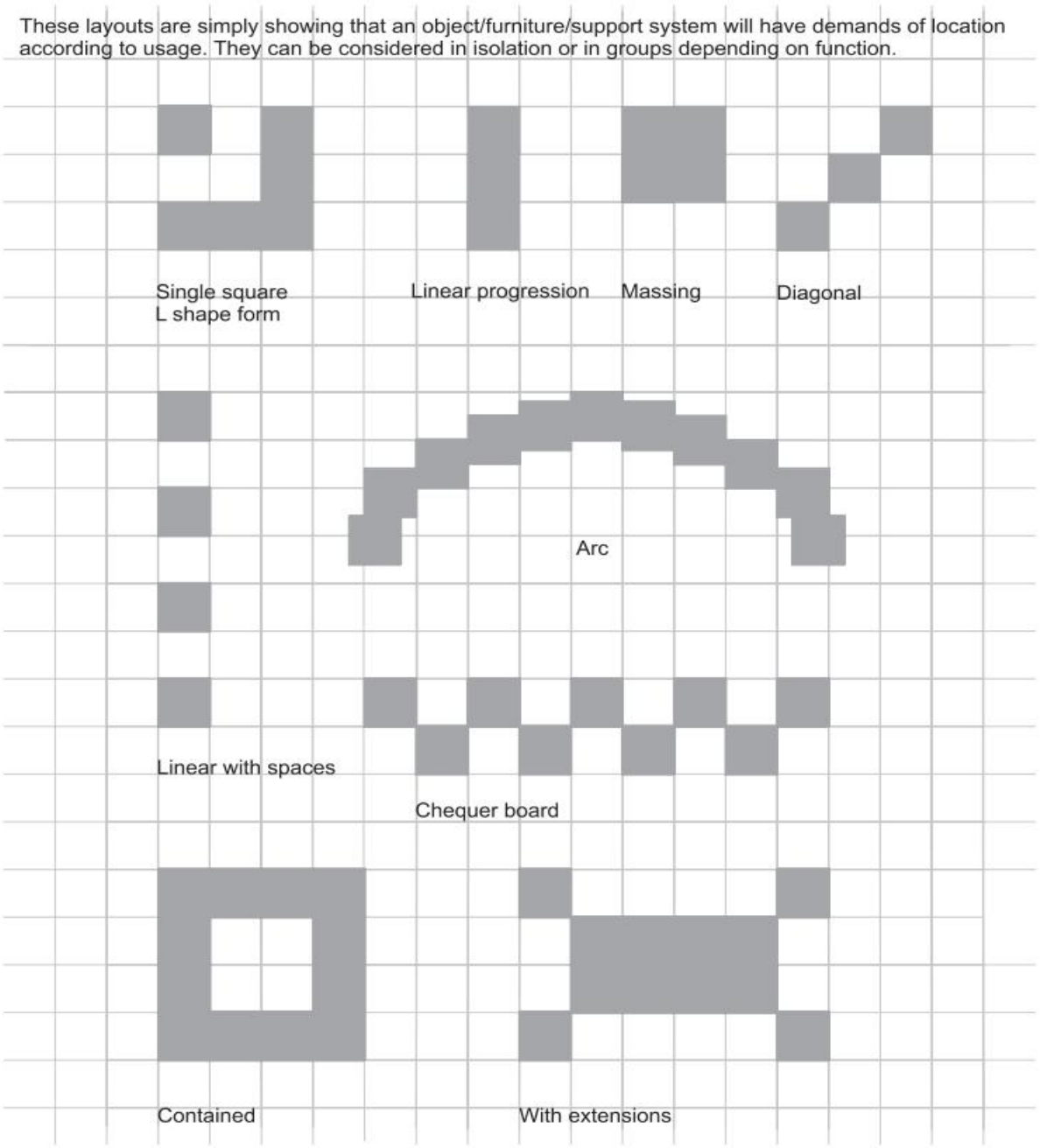

These layouts are simply showing that an object/furniture/support system will have demands of location according to usage. They can be considered in isolation or in groups depending on function.
Single square
L shape form
Linear progression
Massing
Diagonal
Arc
Linear with spaces
Chequer board
Contained
With extensions

Fig. 1.26 Object layouts

1.10 Case Study 2—Ardmore Park

The Ardmore Park's building's exterior is a wonderful tour de force that is smoothly curvy with indents demonstrating its plastic quality. From the lounge interior in Fig. 1.29, the occupant can see part of this curvilinear quality on the structure, but the resulting effect of the interiors is disappointingly conservative and

soulless and has no link with the energy or character of the exterior. If you study the plan in Fig. 1.28, you can see the core in the centre with the two apartments on the left and right. Apart from the curved ends of each apartment, the central spaces are rectangular and subsequently detached from the spirit of the exterior (Fig. 1.27).

Fig. 1.27 Ardmore Park, Singapore. Architect Ben van Berkel of UNStudio, 2013. *Photograph* by Iwan Baan. *Courtesy* © Pontiac Land Group. Exterior view

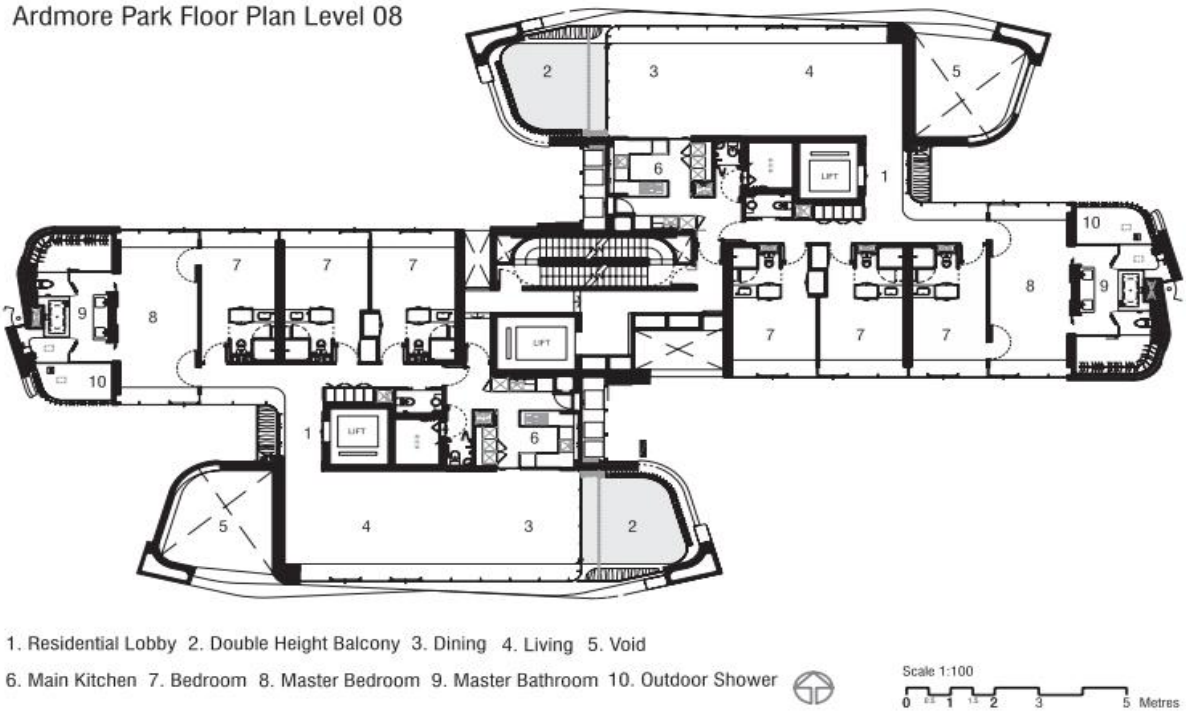

Ardmore Park Floor Plan Level 08
1. Residential Lobby 2. Double Height Balcony 3. Dining 4. Living 5. Void
6. Main Kitchen 7. Bedroom 8. Master Bedroom 9. Master Bathroom 10. Outdoor Shower
Scale 1:100
0 1 2 3 5 Metres

Fig. 1.28 Typical plan of two- and four-bedroomed apartments

Fig. 1.29 Interior view of lounge area

1.11 Case Study 3—China Steel Corporation HQ

China Steel Corporation Headquarters, Taiwan, designed by Kris Yao | Artech Architects 2013. Photographer Jeffrey Cheng

The design of this building, as seen in Fig. 1.32, with its diagonal latticework cladding presents an expression of folding architecture in four sections. The design of tower blocks usually contains a repetitive pattern due to the fact that each floor is identical. Any wavering away from that would indicate a change in the layout that provokes a change in structure or cladding. My guess is that is not the case here. The designers are seeking to modulate the exterior for the sake of achieving some visual movement and not because of the demands of the interior. This is known as 'Facadism'.

If we examine the floor plan in Fig. 1.30, we can see how the corners are pushed out at an angle from the rectangular grid. The interior is unfairly dominated by the lattice work cladding that disturbs the stability of the horizontal/vertical framing. Another revelation is that my cropped version of the plan in Fig. 1.33 clearly shows how conformist its rectilinear nature is, accepting that this is the service core of the building with lifts, stairs and toilets. There are no clues at all about the synergy of this building. The partitions and doors to the offices could have been planned at angles to reflect the angled façade (Figs. 1.31 and 1.32).

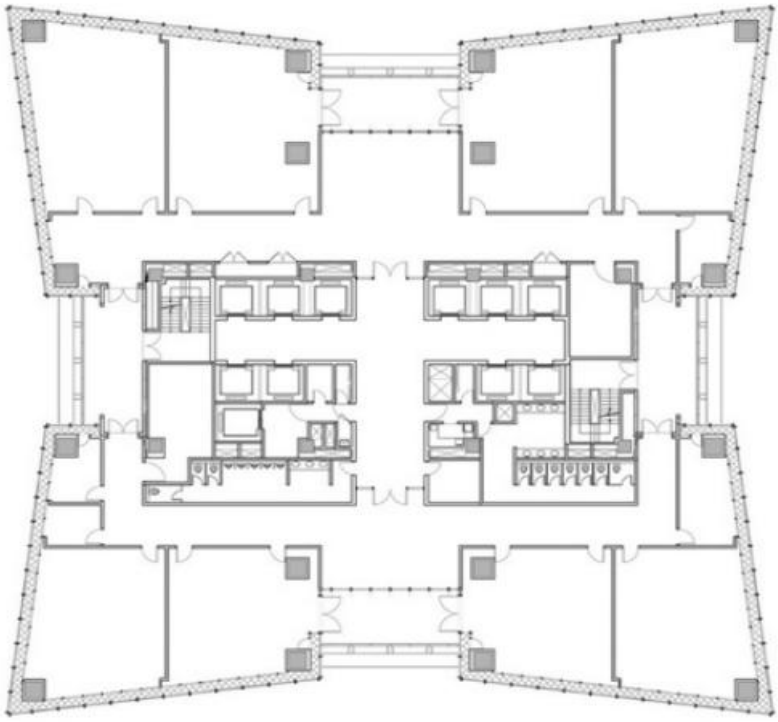


Fig. 1.30 Typical floor plan without furniture

Fig. 1.31 Interior of a lounge area

Fig. 1.32 Exterior of building

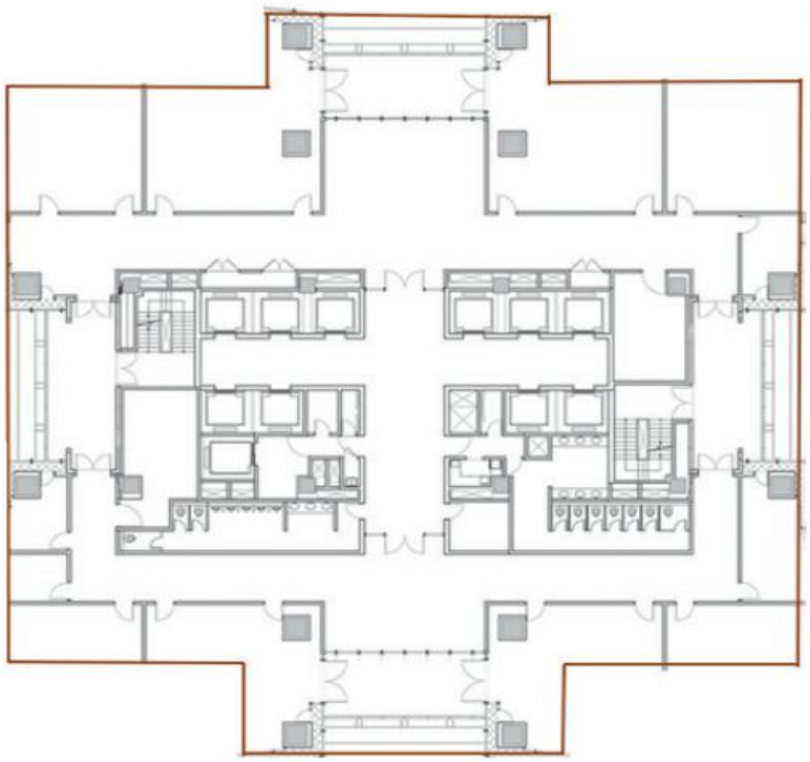


Fig. 1.33 Typical plan cropped by author to reveal the dominance of the rectangular grid

1.12 3D Planning—Includes Enclosing Forms and Support Functions

I have stated before that planning is a two-dimensional activity of a three-dimensional situation. So, the implications of height, as determined with the idea of layers previously explained, have to be taken into consideration.

Height Lines in Fig. 1.34 illustrates common heights in relation to the human figure that are associated with the foot—standing and walking; the bottom—sitting; the elbow (hands)—working surfaces.

The Horizontal Zones were mentioned in my last book and are an extension of the layers system. The materials reflect common wear and tear through time. They are given as follows:

A. Ceiling zone—lighting, services, acoustic properties, not usually accessible. Plaster
B. Display zone—a common area for seeing information, storage, accessible. Plaster/wood
C. Working surface zone—for writing, reading, making, accessible. Wood
D. Storage zone—for storing items to be used in the associated space. WoodFloor—Stone

The layers in Sect. 1.8 are the major planning elements dealing with structure, support systems and lighting/services. The above zones are integrated into these layers at the same time from an elevational or 3D point of view. These zones are not meant to be dictatorial but are suggestive of common locations even though some interiors will have lighting in the floor, or storage up to the ceiling for example. The attraction for having common locations is that the designer could work out a system or format that could be applied to many interiors.

If we take an historic elevation by Robert Adam for example as shown in Fig. 1.35, the composition is prompted by decorative content around the functions of a doorway and fireplace. My geometric analysis shows how proportionally formulaic the composition is. The geometry of planning floors is not dissimilar to this example of elevational planning.

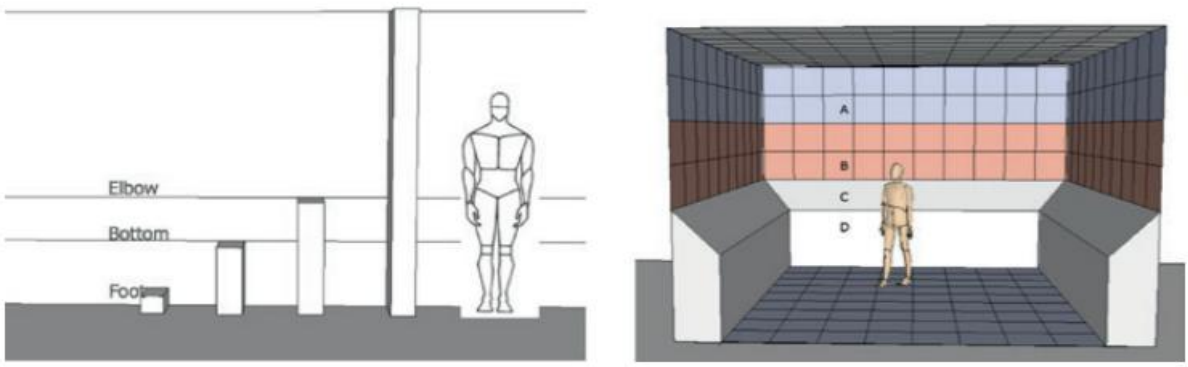


Fig. 1.34 Height lines and horizontal zones

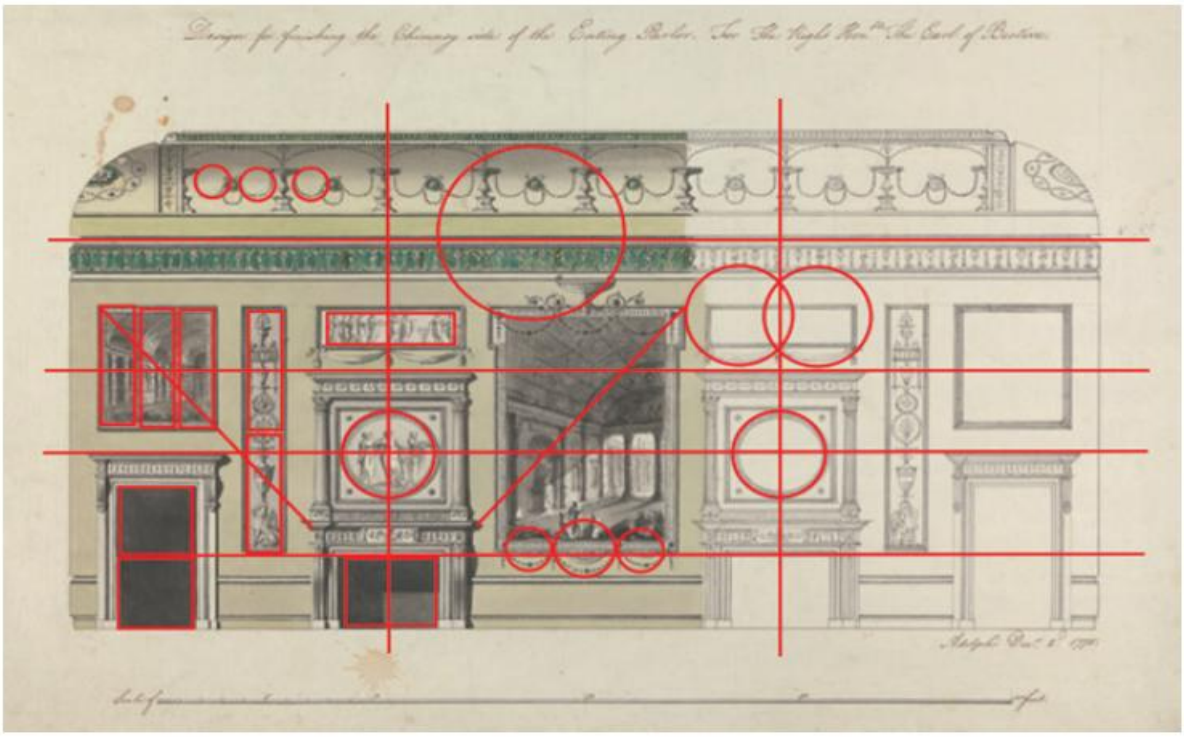


Fig. 1.35 Headfort House, Kells, Ireland, by Robert Adam. Eating Parlour elevational analysis. 1771. Courtesy Yale Center for British Art

1.12.1 Major Conceptual 3D Planning Elements

The illustration in Fig. 1.36 is a summary of the basic conceptual elements we have to handle in planning, under which many variations are designed according to a particular project. The following images are examples of each of these elements taken from different projects (Figs. 1.37, 1.38, 1.39, 1.40, 1.41 and 1.42).

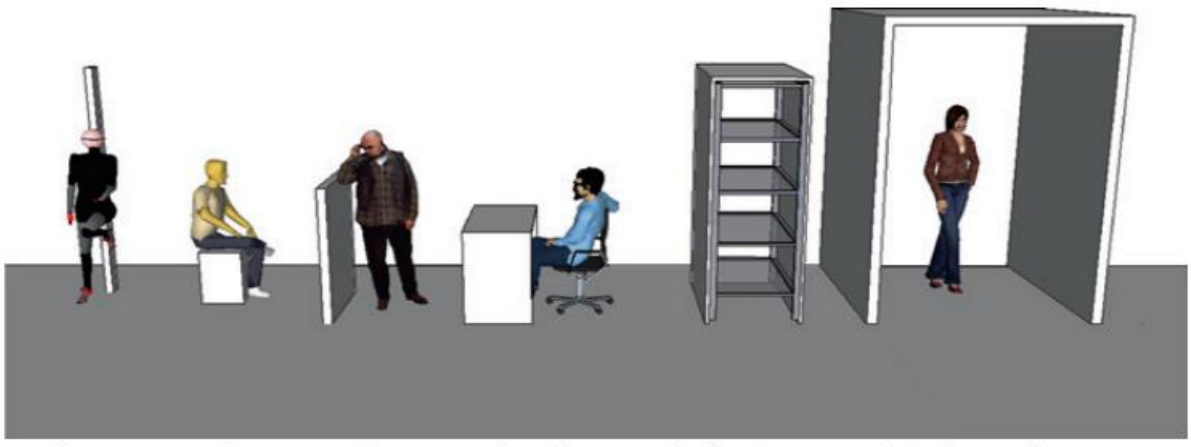


Fig. 1.36 Major conceptual planning elements of interior design structure and support systems. Display/shelving overlaps with storage, small division and interior enclosure. Drawn by author

COLUMN

Fig. 1.37 Tamina Thermal Baths, Grand Resort Bad Ragaz. Designed by Smolenicky and Partner, 2013. *Photograph* by Roland Bernath

Fig. 1.38 Chac seat designed by Mauricio Lara 2013, based on the Mayan Chac seat

SEATING

Fig. 1.39 Glendower House chapel conversion 2002, Monmouth, UK. Designed by Anthony Sully

Fig. 1.40 S 1200 desk by Thonet Design Team, Randolf Schott, 2013

BULK STORAGE

Fig. 1.41 Home storage island in a converted office building in Megurohoncho, Japan, 2013. Designed by Torafu architects. *Photograph* by Daici Ano/TORAFU ARCHITECTS

INTERIOR ENCLOSURE

Fig. 1.42 'Gaia' Innovative workspace designed by David Bruér, Alexander Littorin, Vanessa Bui, Filip Sundblad and Johan Netzler in conjunction with the European Furniture Group, 2013

1.13 Conceptual 3D Origins Within a Space

The most difficult challenge facing any designer is to be able to throw off the shackles of convention in order to be liberated and handle the spatial needs of the client without prejudice or primed responses. The baggage that a designer brings to every project is made up of his/her own predilections, current trends and client's preferences. In order to begin the design process, the designer should be neutralised and unbiased. The drawing in Fig. 1.43 is intended to show how all of the interior elements can be conceived as growing out of the enclosure, even though they may be moveable, because nothing is suspended in mid-air and it shows the strongest connection the forms have with the enclosure. The column in the drawing, whilst it is immovable and structural, can still contribute to the space by offering certain support facilities. From these early conceptual notions, more specific shapes, materials and textures will be developed in line with the growing demands of the brief and insightful research.

Figure 1.44 shows how I perceive the design of the chair grew conceptually from a box to sit on, to the need for an arm rest and to the need for a backrest. The simplified drawing progression squares everything as a starting point, from which the designer runs through a variety of choices and aims concluding with the solution of one continuous flat element that is seemingly bent and formed. It is a particularly satisfying design because of its innovative approach.

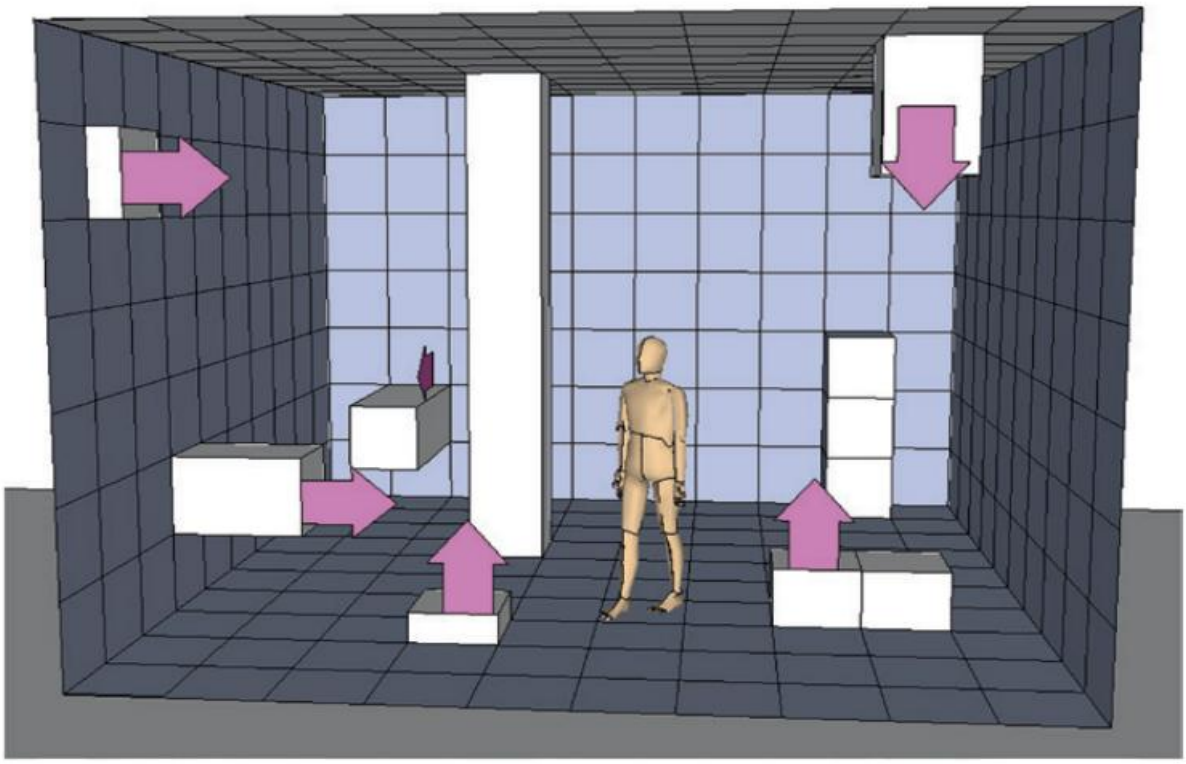


Fig. 1.43 Conceptual 3D origins

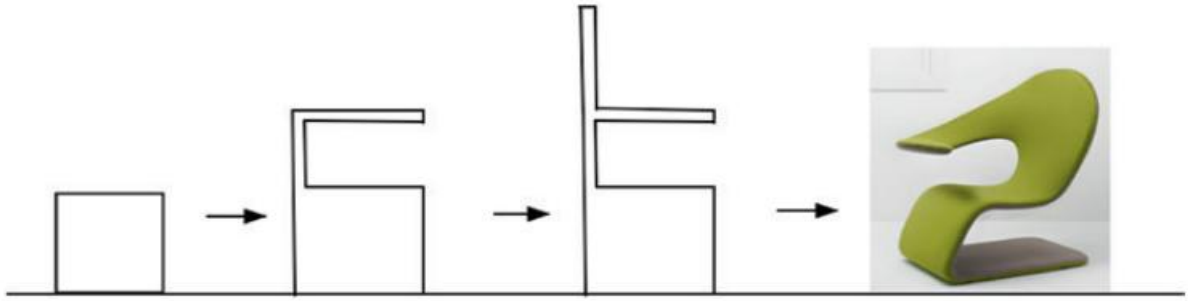


Fig. 1.44 Concept progression to Aleaf chair designed by Michele Franzina and Venezia Home-design Team of Designyouedit, Padua, Italy, 2013

1.14 Case Study 4—Placebo Pharmacy

The plan in Fig. 1.45 has several 'skins' of structure, beginning with the exterior circle, wrapping around an octagonal enclosure followed by columns also forming an octagon. The circle returns as a central hub with various support systems concentric to that centre. Note the shelving units fanning out as radii from the centre. Travelling north/south within this building on the first floor is additional staff facility with wavy walls. It should be easy to see from Fig. 1.46 how important it is when planning, to have a grasp of the 3-dimensional qualities of the forms created. Structure and support systems have equal ranking during the planning

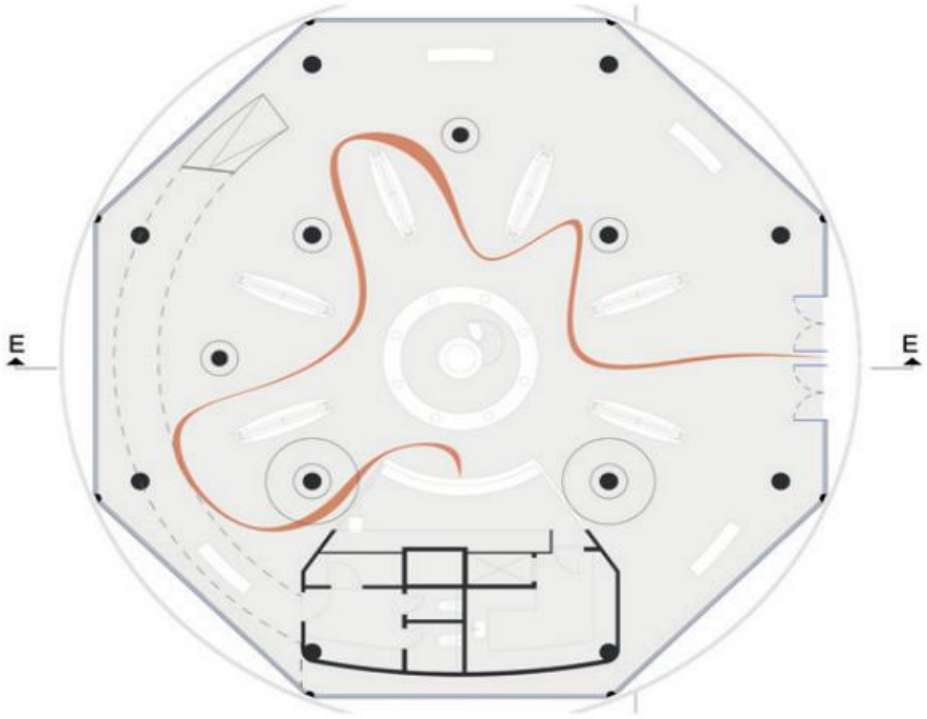


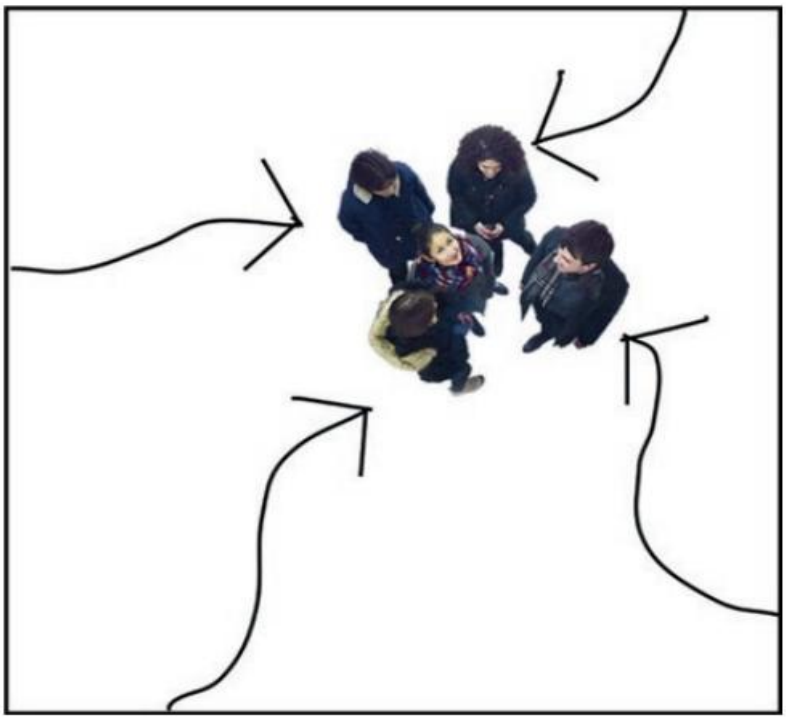
Fig. 1.45 Plan of Placebo Pharmacy in Athens. Designed by Klab Architecture/Konstantinos Labrinopoulos, 2010. *Brown line* indicates public circulation from the entrance

Fig. 1.46 Exterior of pharmacy. *Photograph* by Panos Kokkinias

conception. The traditional approach is to plan a building structure then fill it with the contents, which interior designers have had to suffer for most of the time. The correct and ideal way of designing a new building is an integrated approach dovetailing the structural form with the support systems.

Chapter 2
Circulation Concept

Abstract This chapter is intended to show how more thought is required by the designer in considering how people access and use our spaces. Horizontal circulation is explained by the various routes that exist, which depends upon the function of the spaces. Vertical circulation requires more effort either through the use of stairs, elevators or escalators. Circulation does not just follow the planning of solid elements, but should be considered in equal weight.



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A. Sully, *Interior Design: Conceptual Basis*, DOI 10.1007/978-3-319-16474-8_2

Circulation systems control the way you move around the building or facility. To a great extent, your impressions of a particular interior environment will depend on your experience whilst moving from place to place through the circulation system.[1] **Roberto Rengel**

2.1 Context—Circulation Options—Keyword: Routing Access

Circulation covers the horizontal and vertical movement and interaction of people throughout the interior, namely the users who are the people who work in, own or manage the building, and the visitors who are people visiting for a short duration. Everyone's destination, whether of short duration or for a working day, is a place to perform some sort of activity ranging from passive viewing to physically working. What one sees when walking through the spaces will have its effect, so the journey needs to be considered on equal terms with the activity spaces. This knowledge is part of the development of the Circulation concept. For example, in an office, the users are the people who work there, and the visitors are people who come in with an appointment or to have a meeting. In a museum, the staff are the users, and the visiting public are the visitors. The circulation routes will also be designed to cater for the movement of furniture and equipment as well as any maintenance machinery. An important aspect to circulation is 'Means of escape in case of fire'. The routing of this must comply with building and fire regulations.

When planning the interior through the three stages as explained in Chap. 1, the movement of people is integrated within that activity as a journey, experienced through the series of spaces. The relationship people have with each other and each space is critical information that the designer needs to know. The use of facilities and how people interact with these needs documenting. A time chart needs to be made scheduling which activities take place where and when and for how long. The plan in Fig. 2.1, used in the following two illustrations, shows an office floor and a grid denoting where structural beams and perimeter columns are. As explained in my last book, a geometric analysis, as shown in Fig. 2.2, has to be made of this space to discover the main forces inherent within it that can help determine a planning concept.

Figure 2.2 shows the main access circulation routes from the entrance into the space. The green areas show the window width entering the space with diminishing strength. The concentric rings show the reverberation of the column

[1]Roberto Rengel, *Shaping Interior Space* (New York, Fairchild Publications, 2003) p. 43.

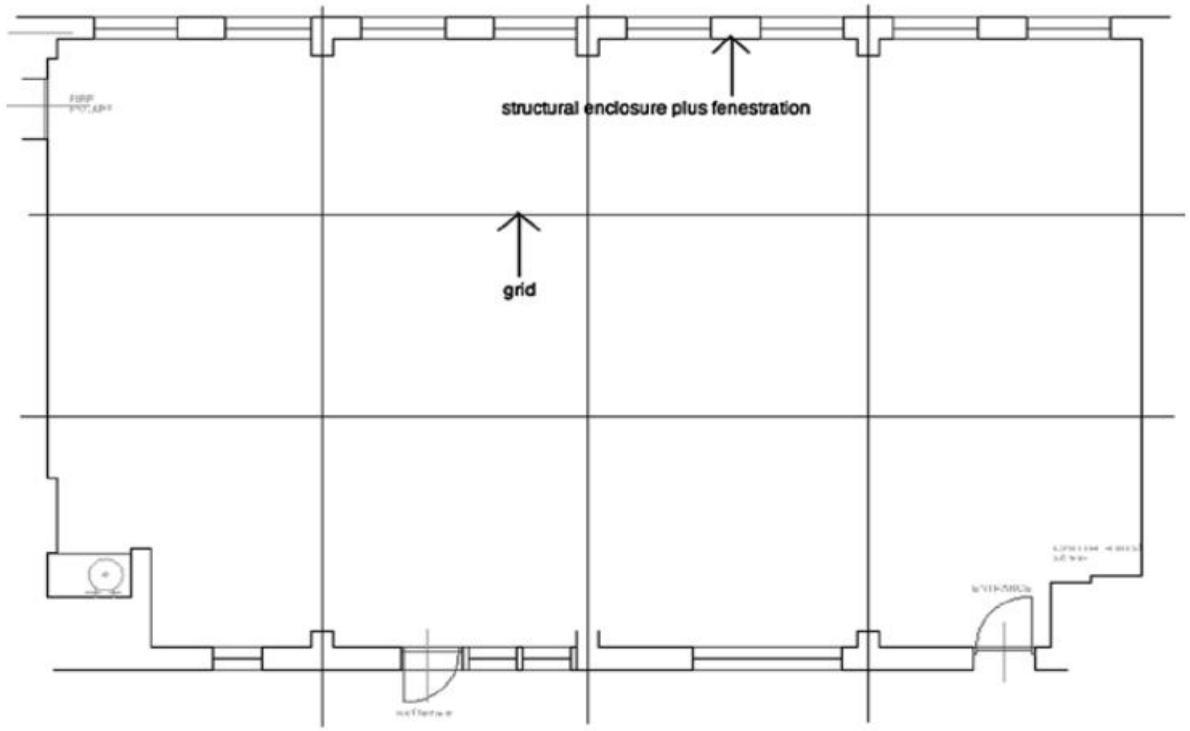


Fig. 2.1 Plan of an empty office floor showing structure and grid lines. Drawn by author

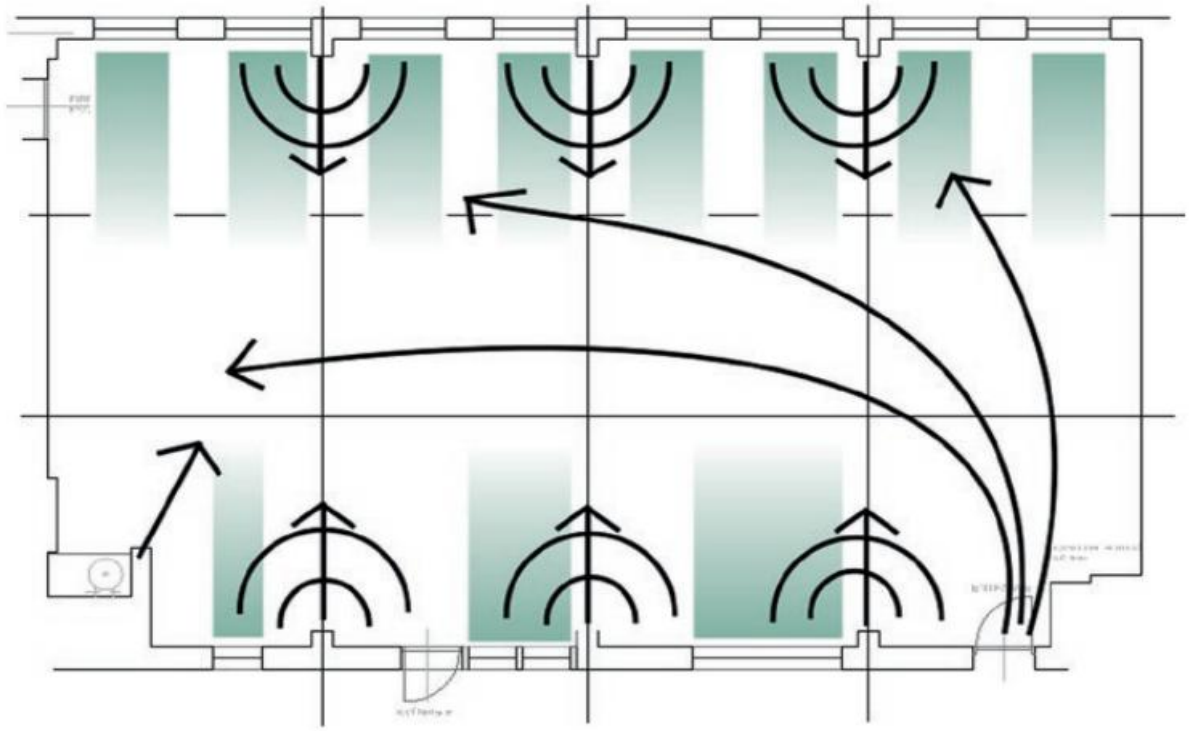


Fig. 2.2 Plan showing geometric analysis including the entrance to the space

projections into the space. Similar analysis should be undertaken for the ceiling plan and for all elevations. It is open to each designer to read and interpret what significance the existing building's structural details will affect the design progression, and these interpretations may vary from one designer to another. The designer may choose to use these geometric forces as an influence upon the shaping of the building form and people circulation routes or he/she may choose to override them. These details form a reference or starting off point, whether it is radiating lines as shown or straight line projections.

Figure 2.3 shows the same plan but with a layout of an office that follows the rectangular grid of the building. The main circulation route is shown feeding the main spaces starting from the entrance, then through reception, to various office desking positions. There are only two fully enclosed areas: one for the managing director and one for the conference room.

Figure 2.4 is a plan of the Crystal Bridges Museum of American Art in Bentonville, Arkansas. It shows an organic layout, which snakes around causing people to follow the curved route experiencing open and enclosed spaces, as well as bridges over the water.

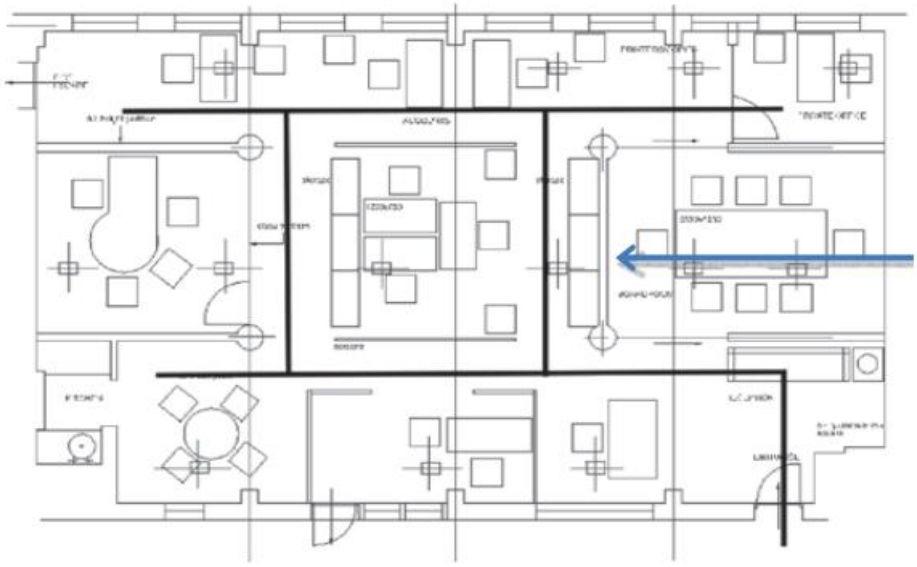


Fig. 2.3 Plan showing one office layout plus main circulation route through

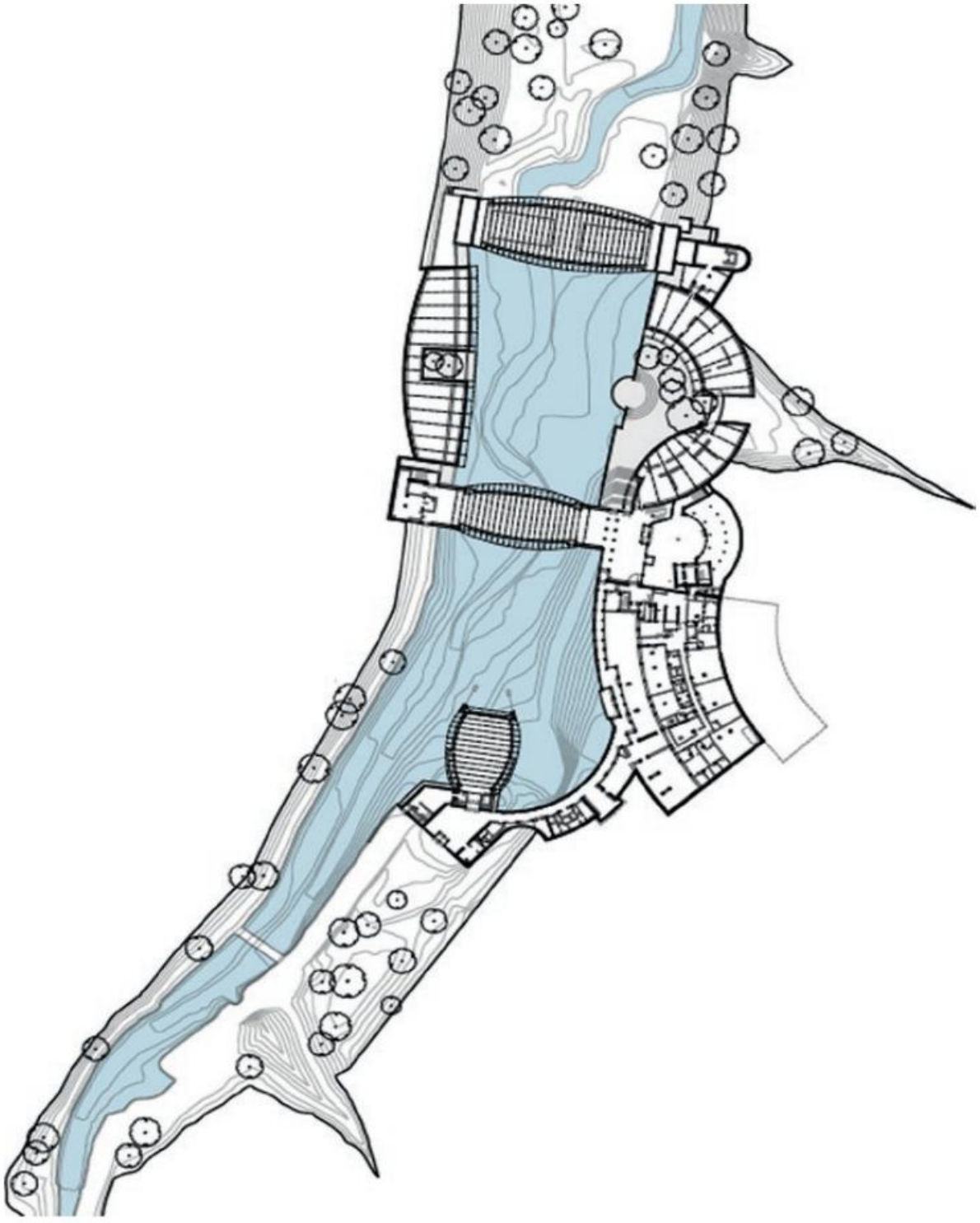


Fig. 2.4 Crystal Bridges Museum designed by Moshe Safdie (Moshe Safdie, b, 1938 in Haifa, Israel. He is an Israeli/Canadian architect, urban designer, educator, theorist and author) in 2011

2.2 Horizontal Circulation Options

The leading factors controlling the design of an interior are deploying areas of activity with associated support systems. The people walking through the spaces and using the facilities also have to be considered by the designer, whilst acknowledging their feelings, emotions and proclivities. Of course these are not controlled by the design, but rather are affected by the design. So Fig. 2.5 attempts to show some of the likely horizontal spatial experiences, in an abstract sense that a person may encounter such as welcome, interrupt, choice of direction, seduction, confrontation and persuasion. As soon as the plan and circulation concepts come together, the designer will begin to visualise the spaces in use and the finishes, materials, lighting and colours begin to emerge.

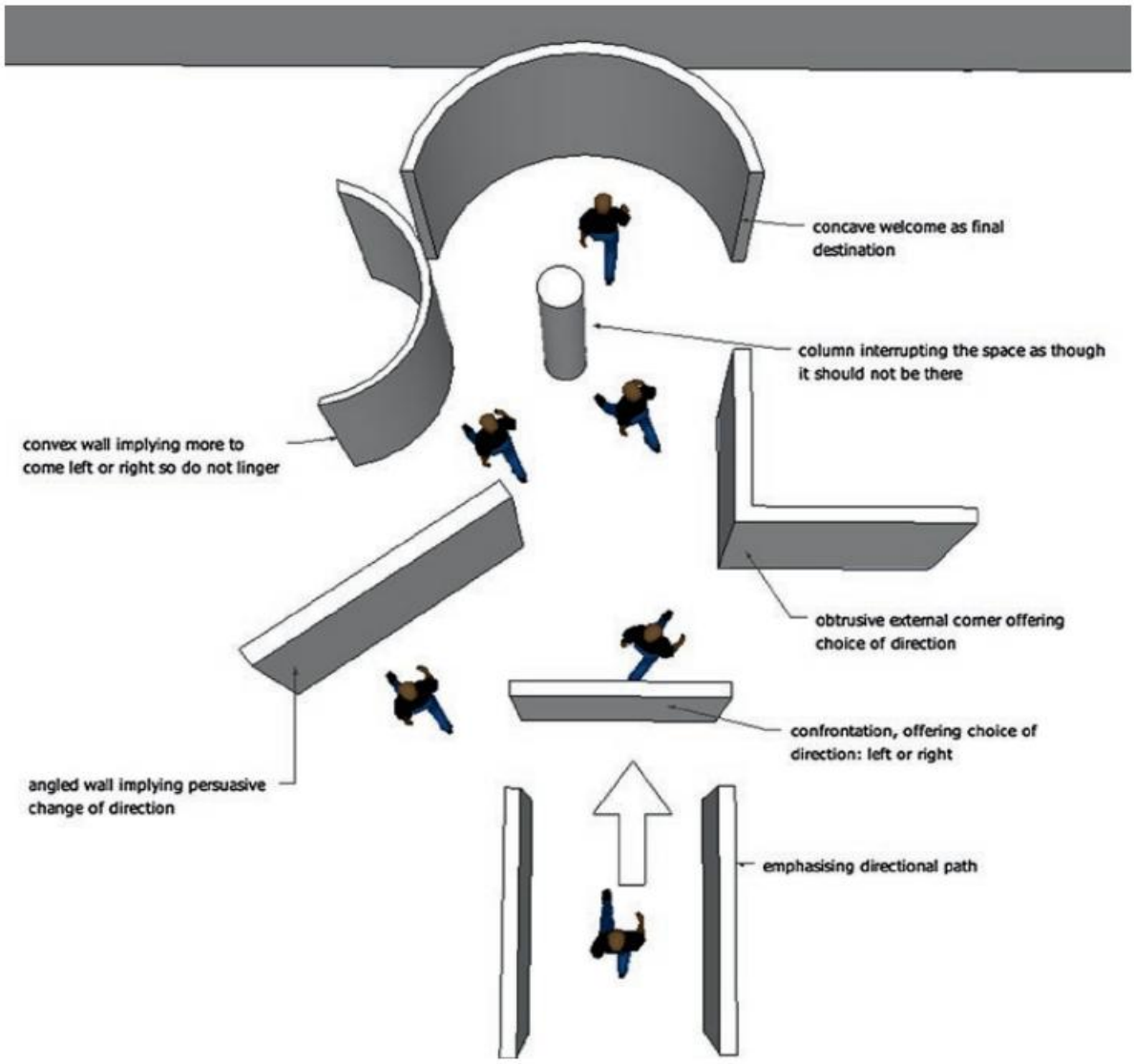

concave welcome as final destination
column interrupting the space as though it should not be there
convex wall implying more to come left or right so do not linger
obtrusive external corner offering choice of direction
confrontation, offering choice of direction: left or right
angled wall implying persuasive change of direction
emphasising directional path

Fig. 2.5 Circulation options

In my last book, I described three major kinds of routes/options on this circulation journey: (1) well defined with choices and signposted arrival at a final destination, (2) multi-directional route with random choices and (3) corridor-type confined spatial route.

2.2.1 Option 1—Well-Defined Route/s

The plan in Fig. 2.6 serves as an example of a well-defined route, and although there are cross roads inherent in the circulation route, the choices to be made are simple.

The plan shows the main access route through from front to back, with a choice in the entrance hall of whether to go left or right there being no difference between them. There is also a choice of direction to go to the first floor, and this decision would rest on the particular space use required on that floor. The third route is for primary access to the bedrooms as applicable for each bedroom user. From this diagram, other subroutes can be deduced on grounds for intercommunication between users, for access to the 2nd sitting room and access to first floor and to the rear. Degrees of circulation usage can be arrived at with the entrance being the busiest, next the central gallery space, down to the rear portion of the building. Whilst there is free movement in the larger spaces, the main routes are steered by the structural divisions of the interior.

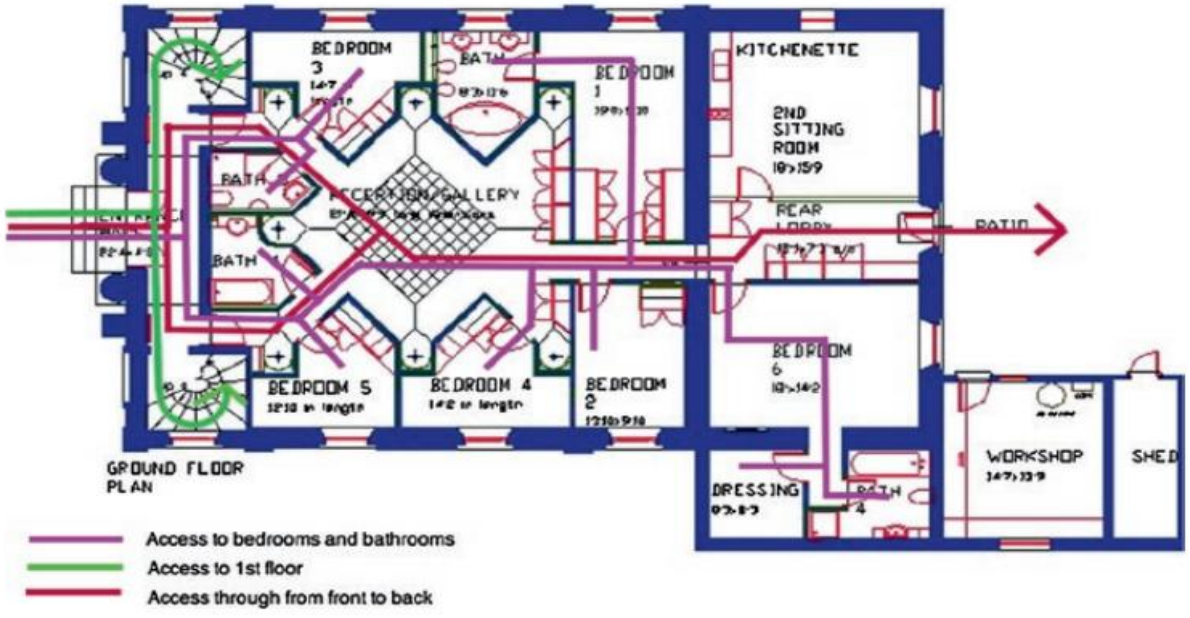


Fig. 2.6 Ground floor plan of the converted chapel Glendower House (Anthony Sully, Glendower House Chapel conversion, Monmouth, 2002) Monmouth, showing main circulation routes both horizontally and vertical access to the first floor

2.2.2 Option 2—Multi-directional

This office layout in Fig. 2.7 is very unconventional. It is the HQ of the Surfrider Foundation Europe and occupies two old industrial sheds which have been converted into two major spaces: one is a free area on the left destined for educational exhibitions, and the other area for 60 staff members irregularly planned for working, meeting spaces and refreshment. Separating the two major areas is a wavelike acoustic sandwich composite panels, allowing the two major activities either side to run concurrently. There is no well-defined circulation path on either side, and the apparent random planning concept reflects this (Fig. 2.8).

Fig. 2.7 HQ Offices for Surfrider Foundation Europe in Biarritz, France, 2012, designed by Gardera-D, Stéphane Bauche with acoustic consultants Point d'orgue, Damien Dupouy

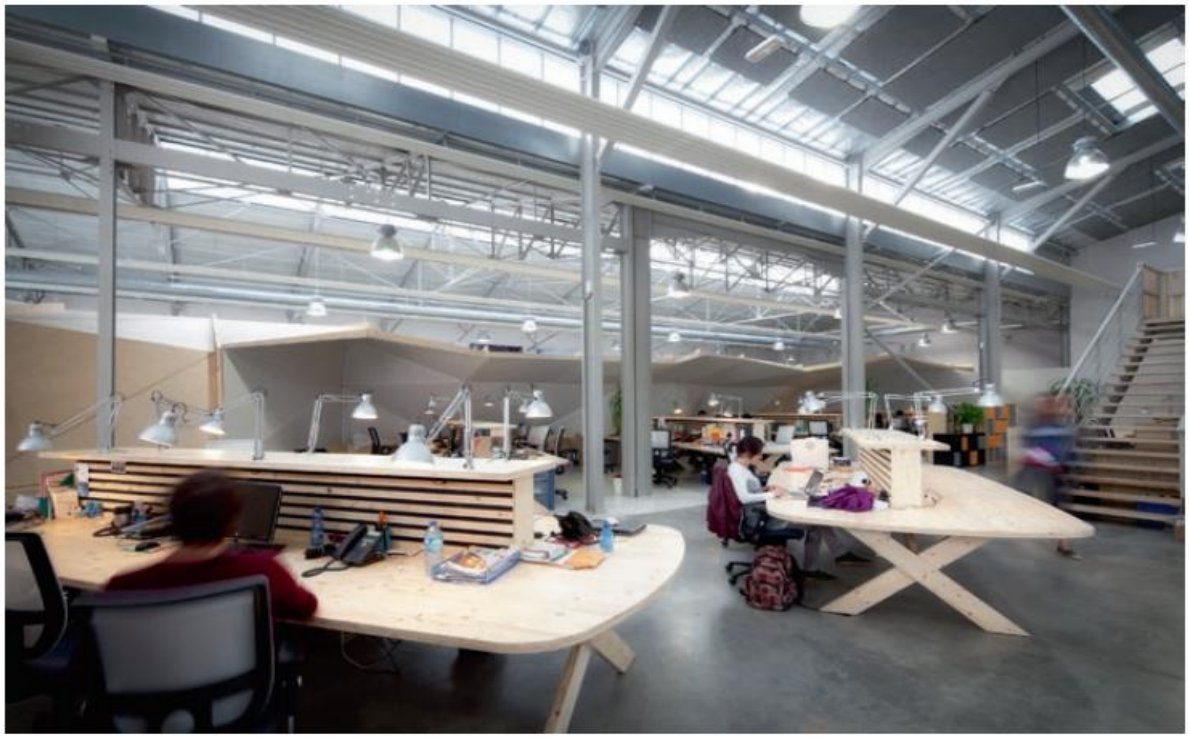


Fig. 2.8 Interior of working area of Surfrider Foundation Europe. *Photograph* by Mathieu Choiselat

2.2.3 Option 3—Corridor-Type Directional

The photograph in Fig. 2.9 shows a very strong linear circulation route in an office showing window desking on the left and double-sided work surfaces on the right. Usually, offices are designed using one of the many office furniture systems that are on the market. It is refreshing to see purpose-built support systems used instead that integrate desking and seating with structure. The suspended boxed cushioned structure on the left is a casual seat. The floor is finished with white epoxy resin, and the vertical panels and ceiling are covered in felt. Another unusual aspect of this design is that interiors commonly have light ceilings and dark floors, but in this case, this is reversed which induces a feeling of contained calm. A few footprints on the ceiling might unnerve some people!

The underground train in Fig. 2.10 is usually made up of separate carriages with a short distance to walk. This new train is linking the carriages as a continuous walkthrough, thus increasing the occupancy of the train, but creating a weird long vista of a possible circulation route that will never be taken.

Fig. 2.9 Tribal DBB Amsterdam offices—digital marketing agency. Designed by i29 l interior architects in 2013. *Photograph* supplied by the architects

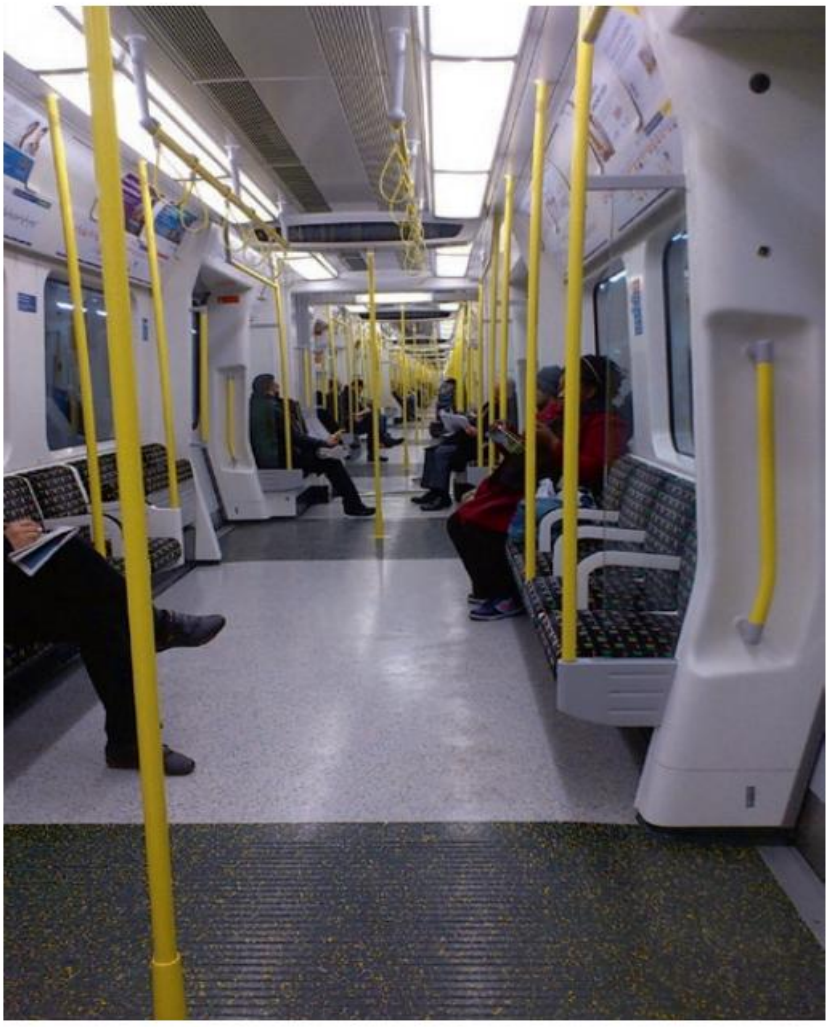


Fig. 2.10 Interior of a London underground train. *Photograph* by author

2.3 Vertical Circulation Options

…stairways are often areas given the least thought and yet can make a building more or less easy and joyful to use depending on their design.[2] **Peter Rich and Yvonne Dean**

Please see Sect. 4.5.6 in Chap. 4 for straight stair types, otherwise other stair forms are as follows:

- Dog-leg. At least two flights, not necessarily of equal length, and a half landing.
- Open well. With two more flights and with a generous horizontal space between flights.
- Geometric. Helical, circular or elliptical form rotating from a centre with tapered treads (see Fig. 2.14).

Figure 2.11 shows two possible directions for ascending from one floor to another, namely:

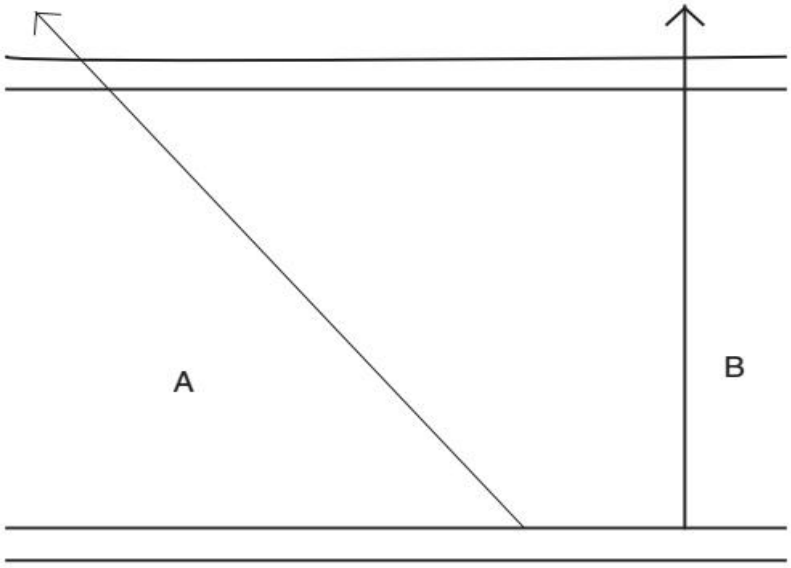


Fig. 2.11 Diagram showing two basic vertical directional choices

[2]Peter Rich and Yvonne Dean, *Principles of Element Design* (Oxford, Butterworth-Heinemann, 1977) p. 129.

Fig. 2.12 Ramp up to 1st floor. Placebo Pharmacy in Athens, designed by Klab Architecture/ Konstantinos Labrinopoulos, 2010. *Photograph* by Panos Kokkinias

2.3.1 A—Incline

2.3.2 A1—Straight Staircase or Ramp

Static straight or dog-leg staircase for a person to climb from step to step, or a ramp if the incline is about 1:12 ratio.

Common usage in homes, flats, firescapes, and any building of less than four storeys (Fig. 2.12).

2.3.3 A2—Escalator

Straight moving escalator for option to climb or be carried.

Popular in underground stations, shopping centres and airports.

Figure 2.13 shows a dog-leg staircase, escalator and an elevator. The escalator travels diagonally across the atrium, not only to fit the narrow width of the centre, but it is also a more agreeable and dynamic way to pierce the space.

Fig. 2.13 Escalator in Bentalls Shopping Centre, Kingston, Surrey, UK. Designed by BDP architects in 1994. *Photograph* by Andy Borzyskowski

2.3.4 B—Vertical

2.3.5 B1—Helical Staircase

Helical staircase, as shown in Fig. 2.14, which repeats the same action as A1 but on a concentrated circular route, hence taking up less floor area.

It can be a second option to A1 where space is at a premium, or it is designed to be a feature. Hence used in hotels and cinemas but on a larger scale.

2.3.6 B2—Elevator

Usually used in multi-storey buildings.

Tower flats, hotels, shopping centres, department stores, office blocks and ships. Some elevators provide a completely separate box that has no visual connection to the interiors, whereas others can be transparent boxes which retain a visual connection.

Fig. 2.14 Helical staircase in a domestic residence by Fine Iron, Wales, UK

When two or more floors are involved, the positioning of vertical circulation becomes regarded as a service area of the building, including means of escape in case of fire. So rather than being an area designated for any particular activity, it is a means of getting from one level to another. However, this does not relegate it to a lower order space in which minimal design effort is required. On the contrary, it can provide a focus of great design energy, with sculptural forms and, in the case of elevators, transparent cars. Inclusive Access and designing for the disabled are now vitally important to the design of circulation.[3] Figure 2.15 shows an elevator placed on the outside of the building, thus saving internal floor space as well as providing a visual attraction.

Apart from voids, lightwells and atrium spaces, which provide visual connections between floors in multi-storey buildings, the means of vertical circulation provide the necessary physical access points. Two aspects to this that designers should consider are as follows:

- The means and purpose for ascending
- The means and purpose for descending.

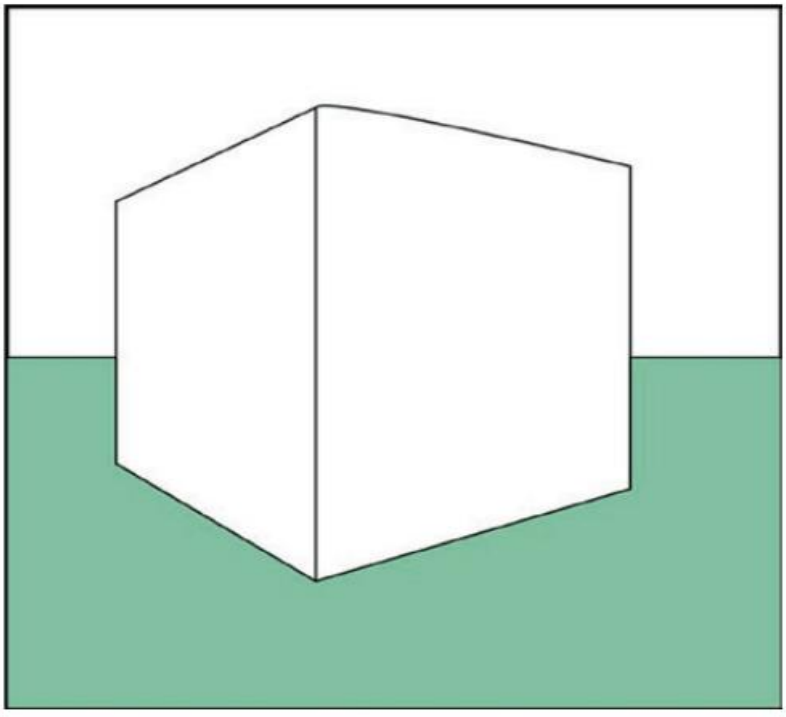
[3]Selwyn Goldsmith, *Designing for the Disabled* (Abingdon, Oxon, Routledge, 1997).

Fig. 2.15 External elevator with transparent car. Channel 4 Office, Victoria, London. By Richard Rogers Partnership, 1994. *Photograph* by author

There needs to be an introductory space (lobby, landing) to both of these conditions. It is fateful when designing a scheme that consists of more than one floor that the floors are almost treated as separate interiors. Of course it depends on the particular project, but their other connections apart from circulation areas are the architectural elements such as structural columns, service ducts, voids, external wall fabric and windows.

Chapter 3
Three-dimensional Concept

Abstract This chapter deals with perhaps the most difficult task of conceptualising 3D form and space. First, I examine the constituent parts of 3D form, and then I unfold what a person registers in sequence when entering a space. Light defines how a space is seen, by reflecting off surfaces and form. Design is about expression of identity and 3D form will play a major role in this. 3D interior form is put into three starter groups: the square, circle and triangle families. The chapter continues with illustrations of how junctions and the meeting of surfaces need close consideration and the intrusive corner concept expanded into possible solutions. The early growth of the 'integrated' interior is explained with illustrations, culminating with examples of 'Freeform' architecture. I finally question what is Deconstructed interior as well as Disintegrated interior?



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A. Sully, *Interior Design: Conceptual Basis*, DOI 10.1007/978-3-319-16474-8_3

We require a measure of possession and surrounding to feel the impact and the beauty of a building. The feeling of buildings and our sense of dwelling within them are more fundamental to our architectural experience than the information they give us.[1] **Bloomer and Moore**

3.1 Context—Keyword: Modelling

Three dimensions, within the field of interior design, are defined as being formed by actual physical shapes of building structure and support systems. The planning of interiors involves the handling and manipulation of these elements in order to achieve the amount of space and facilities required. This is achieved through dimensional spatial control and adjustment. The concept will thus be formed as something that will eventually be translated into a material reality. There are two distinct actions that are being made:

1. Enclosing and wrapping space—containment
2. Provision of support systems, objects, furniture—contents

3.2 Constituent Parts

These were explained in this chapter on planning, and we now have to look at these actions in terms of a feel for the three-dimensional character and forms being used. There is always a danger that an existing building or a new building being designed by an architect will impose a structural discipline that distances itself away from the interior support systems. The designer is then confronted with the task of FILLING the empty spaces and planning under the constraints of the building structure. My last book outlined the various conceptual ways that a building is fitted out, and whatever approach is taken it is important that the resulting interior demonstrates an harmonious relationship with the building, that it BELONGS, and feels right to the user and visitor. Looking at the three-dimensional field that has to be formed means that the designer has to have a good feeling for the space between these physical elements and must perceive the space nude of any adornment. Figure 3.1 is summarising possible 3D tasks apart from the floor.

The act of shaping the space and moulding the forms that enclose and occupy means that a series of decisions have to be made with regard to orientation of the human figure, and the direction and distance that the enclosing forms spring from ranging from the vertical to the horizontal. Figure 3.2 is attempting to show what options of surrounding forms to a human figure or central feature can be considered by the designer. The

[1]Kent C Bloomer and Charles W Moore, *Body, Memory, and Architecture* (New Haven and London, Yale University Press 1977) p. 36.

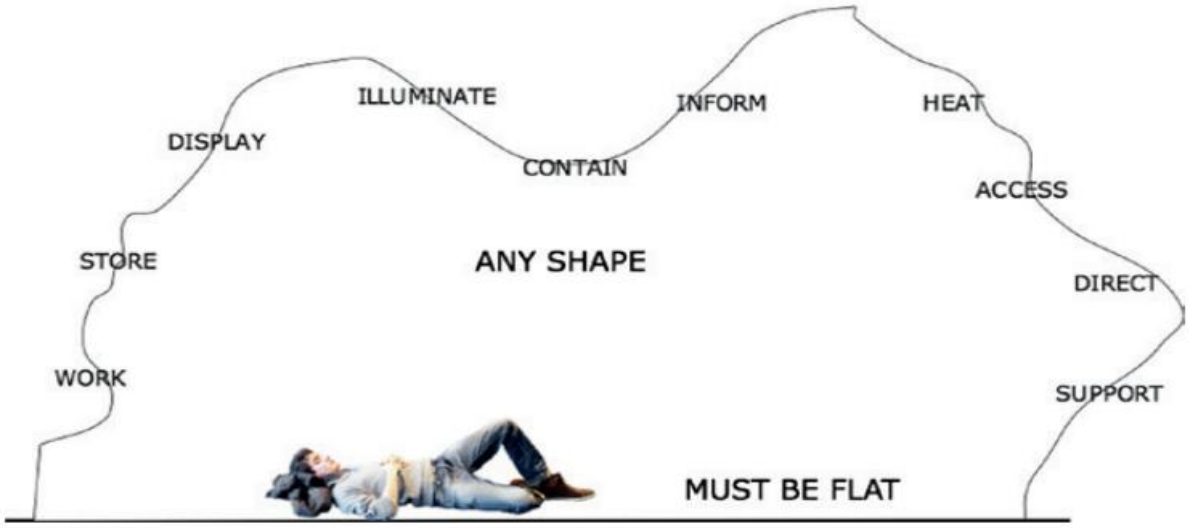

Fig. 3.1 Showing whatever 3D options there are for the provision of enclosure and facilities the floor plane has to be flat, sloped or stepped

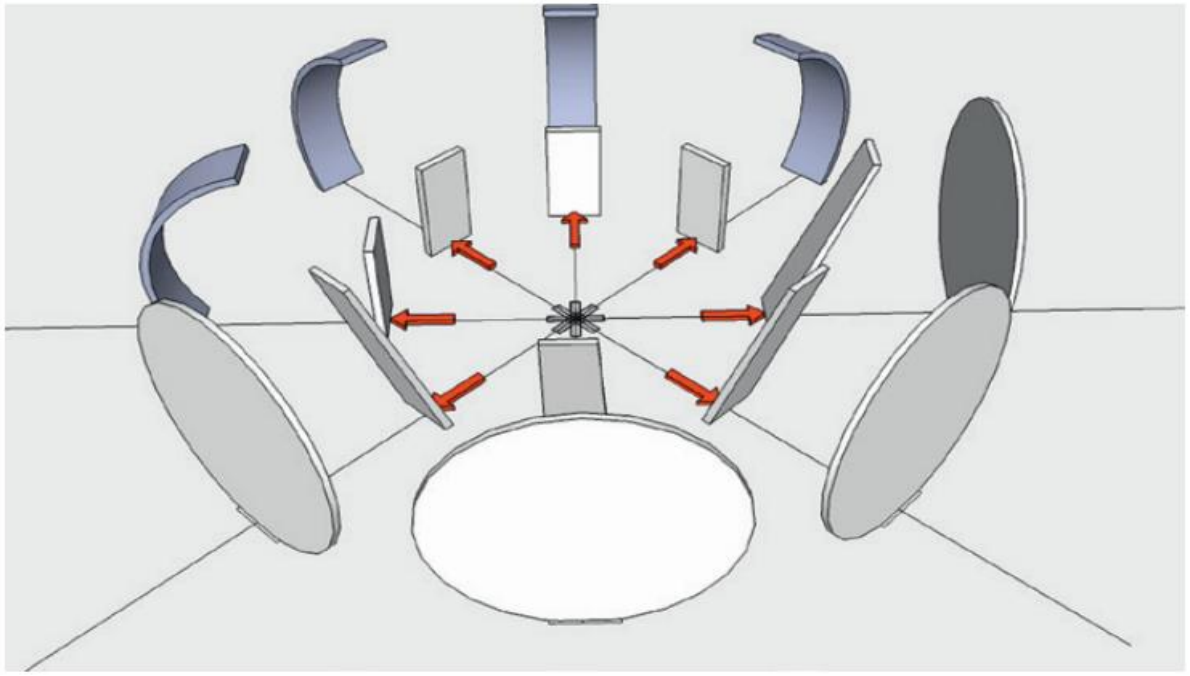

Fig. 3.2 3D generation drawing showing orientation and direction from one viewpoint, and some of the choices of form that will pass through the designer's mind

shapes are indicating the beginning of options of form, which can expand to many permutations. All interiors have major vistas or viewpoints from key positions. These are usually the prime movers that the designer uses in designing the interior.

The important point to emphasise here is that the figure, or the pivotal view within an interior, can rotate 360°, which means careful consideration has to be

made as to what angle or curvature the form will take. The chapter on Planning advises on what major axis of human circulation will be adopted, and the axis drawn here will also link to the major planning axis.

All support systems are included within this form-making exercise, but the following needs noting: on many occasions, furniture items will be sourced from manufacturers and selected on the basis of their fitting in with the 3D concept of the interior. But they can also be purpose made to the designer's detailed designs either by a manufacturer or a craftsperson. The same can be said for many interior components, which can be specified 'off the shelf' or if nothing on the market is deemed suitable by the designer, then the designer will pursue various options in order to arrange for a 'special one off' product to be installed.

3.3 Realisation Sequence

The inclusion of 2D decoration in Fig. 3.3 is intended to show where overlaps of conceptual thought can happen between, as in this case, decorative elements and 3D elements. The formation of a 3D concept is dependent upon planning

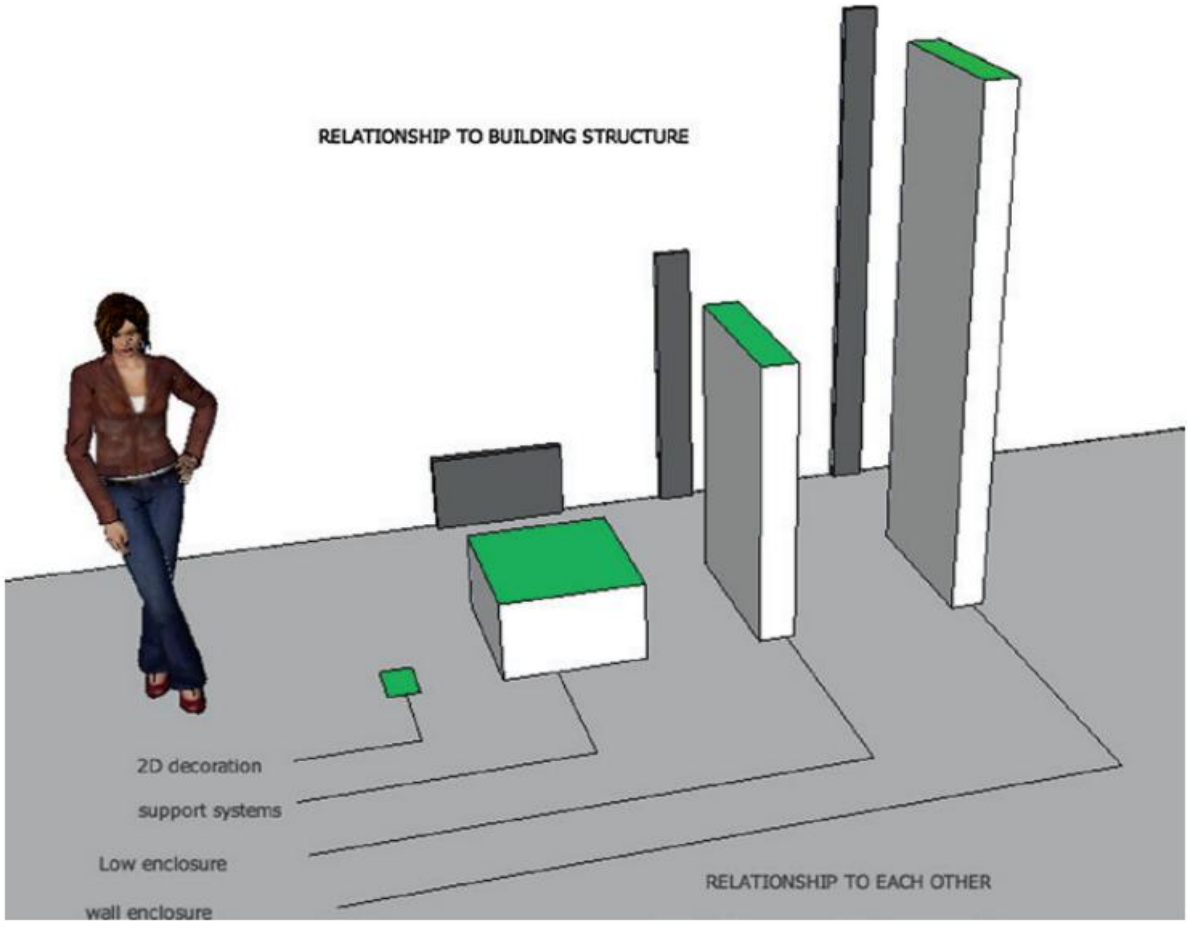

Fig. 3.3 Illustration showing a simplification of Fig. 1.36 in Chap. 1 of major items for consideration for a 3D concept

relationships as well as realising consequent elevational situations. It is easy for a designer to have a mental vision of common interior artefacts whilst designing, because the sequence of activities of a person entering a room is envisaged. For example, a typical sequence could be thus (bearing in mind that far distance is established before near distance and ignoring other people initially):

A person entering a space may need to switch on artificial light;
The size and volume of the space is recognised;
This in turn may reveal enclosing items;
The impact of decoration in all its forms will be registered;
Floor to ceiling structural items (or non-structural);
Content items such as furniture, screens, and lighting; and
Detailed smaller items that are handleable or portable.
(See Fig. 3.6)

Just going through the above, the designer will have visions of commonly available items but these will be cast aside for a fresh outlook to begin. Whatever the activity and facilities provided, the project brief will stipulate certain data to be accommodated. But it will not be such an instruction as '20 chairs required'. Rather it would be 'Seating for 20 people'. This then can be interpreted in many 3D ways, such as single chairs, benches, steps or any other structure that will begin to fit and whether they are to be fixed or removable. Consideration of lighting overlaps with the 3D concept, but we are only dealing with it here in terms of space and form definition.

3.3.1 On Entering a Space

Figure 3.4 presents the extreme artificial lighting conditions of an interior from total blackness to total whiteness. They do not of course represent a normal interior but merely demonstrate both extremes of the light spectrum. It is within these

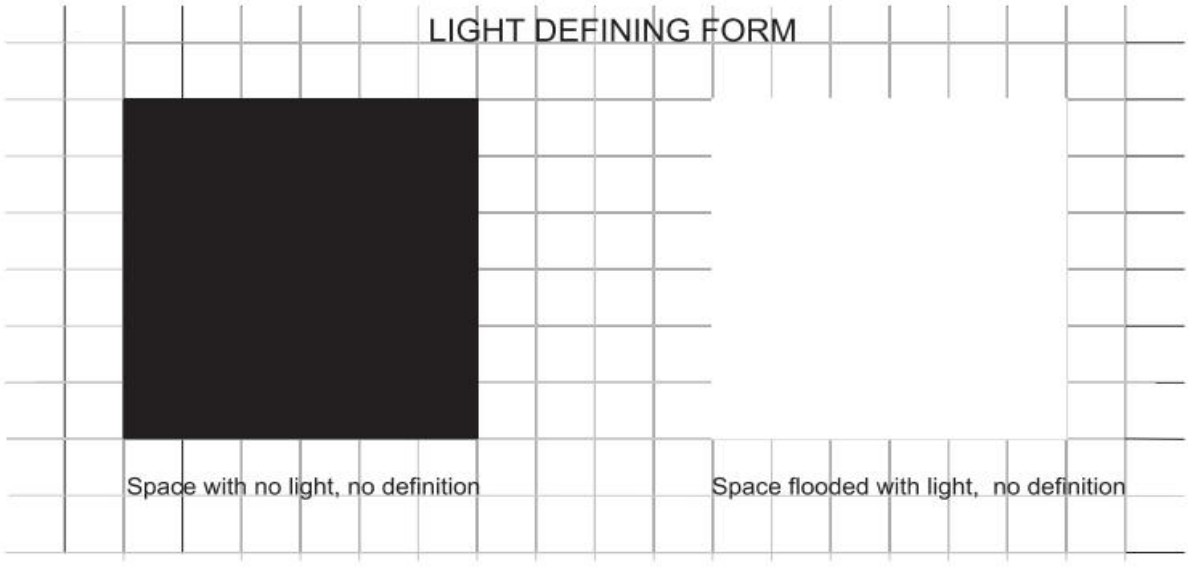

Fig. 3.4 Artificial light spectrum

extreme points that a 3D concept can be formulated simply because light helps define form. Figure 3.5a, b shows the beginning of light in a dark space and the defined form through more light before we move back to the Realisation Sequence.

The Chapel of St Albert the Great is a modern extension to a chapel of the Dominican Order. The Realisation Sequence is labelled in the photograph (Fig. 3.6). Here are the architect's notes for the design:

The vaulted roof is formed and shaped by two parallel engineered timber (Kerto S) beams which run the full length of the chapel. This method of structure can be considered as the skeleton of the building which provides its unique form. Timber provides a lightweight solution that provides a seamless link to the timber interior finishes.

The foyer of the chapel is formed by a series of simple but finely crafted oak frames. The pattern created is consistent with recurring themes within chapel as a series of entrances that lead to the altar. The joints are simple mortise and tenoned joints. The oak is untreated and colours are therefore encouraged to gradually change.

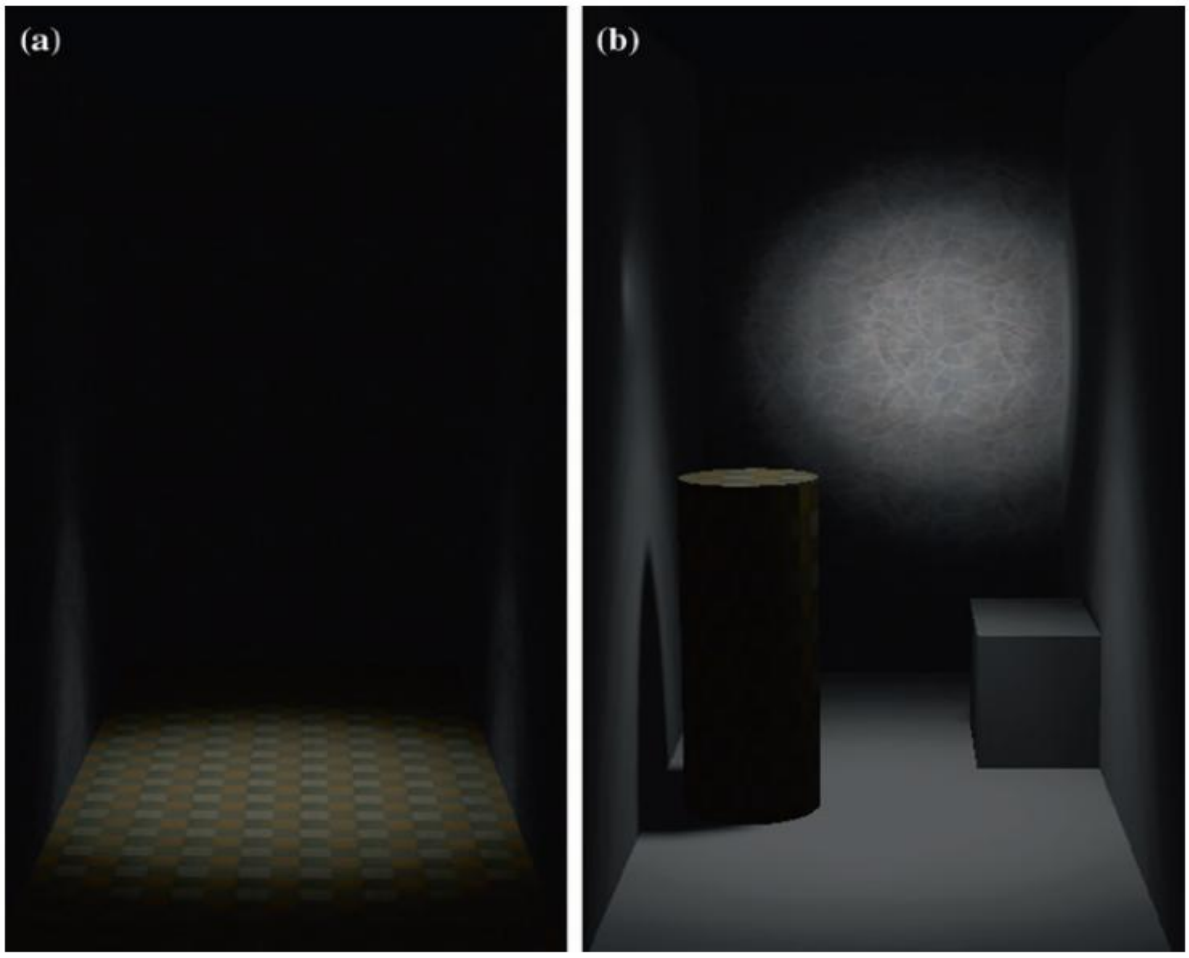

Fig. 3.5 **a** Beginnings of light. **b** Definition of form

Fig. 3.6 Interior of The Chapel of St Albert the Great, George Sq, Edinburgh, Scotland. Architects Simpson and Brown, 2012. *Photograph* by Chris Humphreys. Showing the realisation sequence

The 3D concept of this chapel is comprised of a vertical ribbed wall and ribbed curved ceiling, a smooth stone wall with apertures, vaulted columns and rows of support system seating. Through the visual register of this envelope and its contents, the 3D impact is understood. The vaulted columns are worthy of further examination because they are a diagonal cruciform shape on plan each with a combination of a two long curved arches and two radially curved arches. Viewed together, they combine to make a unique stand-alone structure that is reminiscent of the Gothic arch. The fact that it connects to the building structure with such delicate nodal points adds to the feeling of lightness in its engineering function.

3.4 Identity

The Bilbao Arena and Sports Centre in Fig. 3.7 is a striking building with a simple 3D concept that is transmuted into elevational treatment and structure. The concept is based upon natural form, which relates to the activities of the sports centre as far as healthy outdoor pursuits are concerned, hence the derivation of form from trees (Fig. 3.8).

Readers familiar with my last book may remember on page 125 my explanation of the growth of form using a tree as an example: from trunk to branch to twig to leaf. In the Sports Arena, the columns represent the trunks of trees and the façade its branches and leaves.

Fig. 3.7 Bilbao Arena and Sports Centre, Spain, 2010. Architects ACXT/Javier Pérez Uribarriy Nicolás Espinosa Barrientos

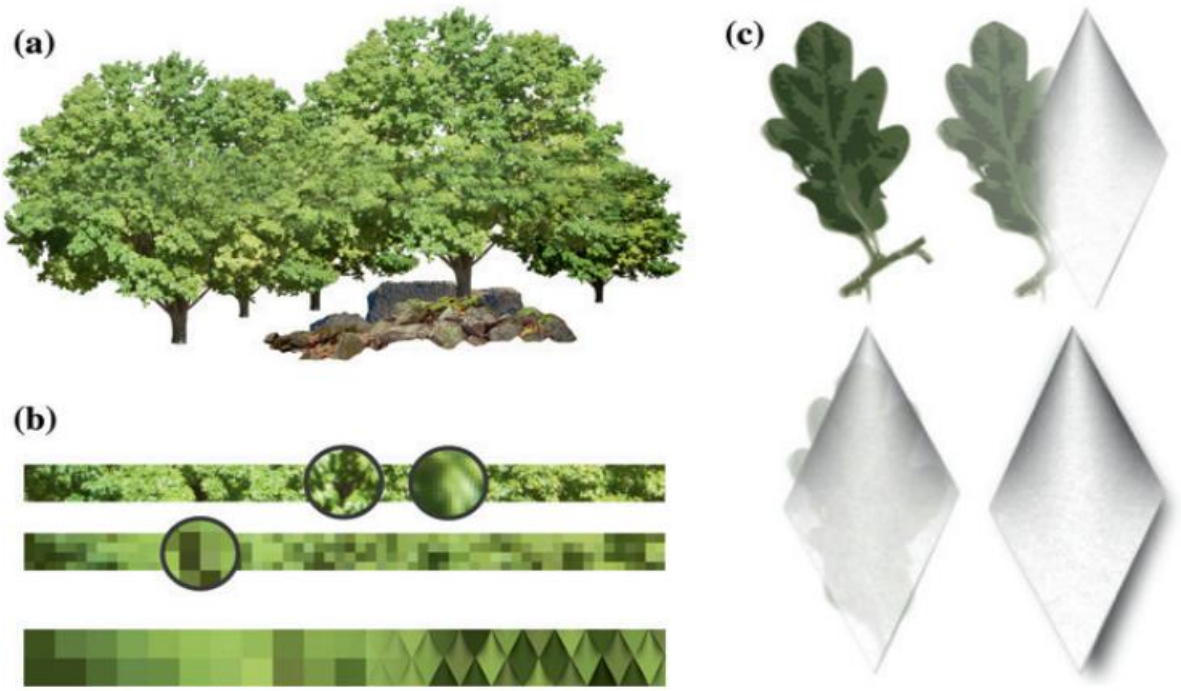

Fig. 3.8 **a–c** Architect's concept studies of tree leaf forms to inspire direction

3.5 Basic 3D Geometric Origins of Form

It is essential that the student of design understands the basic geometry that is the beginning of all design thoughts. My last book explained historical sources and influences, and here I wish to analyse further the beginnings of 3D form as it relates to a defining concept for interior design. All forms and shapes can be broken down and analysed in terms of its constituent parts. Let us analyse in Fig. 3.9, the three basic 2D shapes that are the prime movers of all 3D shapes and forms: the square, the circle and the equilateral triangle.[2]

Each illustration shows the complete shape before it is broken down into the linear and enclosed component parts that are suggested by its inherent underlying symmetrical structure. Each shape is shown with its major axes that either bisect the shape from the perimeter with coordinates that pass through the centre, or that are concentric from the centre reproducing the original shape. In linear terms, the square has four corner parts, four side parts or two large corner parts. The triangle has three corners and three sides. Because the circle has no defining perimeter point, its central coordinate divisions are endless. We can therefore present an example of two and four parts. There are of course endless permutations for composing more enclosed component parts. It is possible to divide all shapes into two equal halves using one axis down the centre.

The next series of drawings are matched with appropriate projects and are showing those families of forms that have a basic relationship together with interiors that fall within that category. This is the beginning of linking those parts of an interior that constitute a 3D concept such as wall enclosure, low enclosure, support system and decoration. The drawings are simply illustrative of character initially, with more complex relationships possible as the interior examples show.

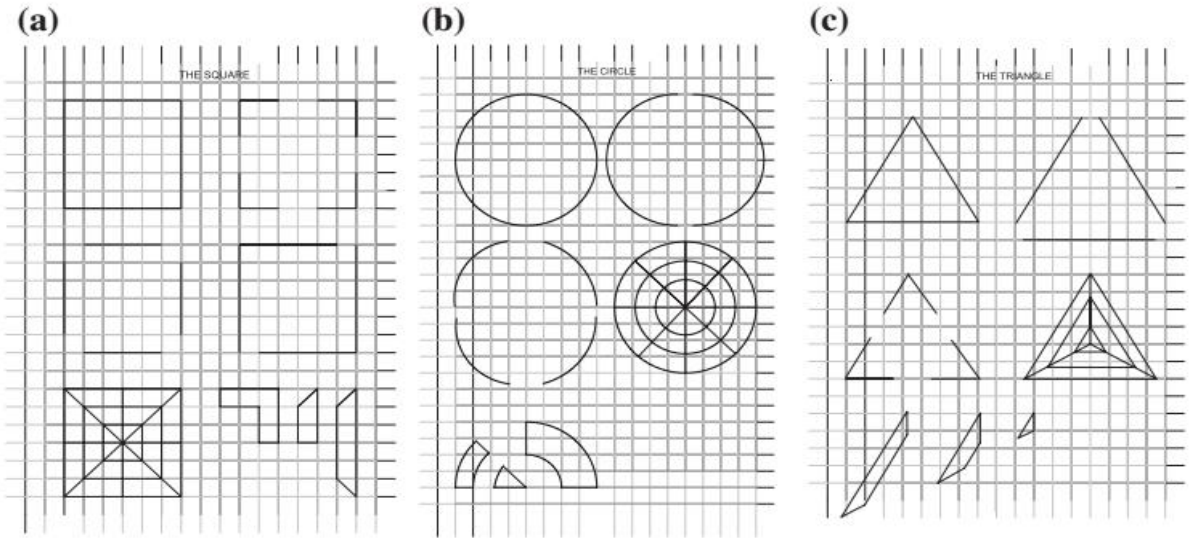

Fig. 3.9 **a** Square, **b** circle and **c** triangle diagrams

[2]These are the constituent overlapping shapes that symbolise the Oriental religion of Zen Buddhism.

3.6 Family of Forms

3.6.1 The Square Family

See Fig. 3.10.

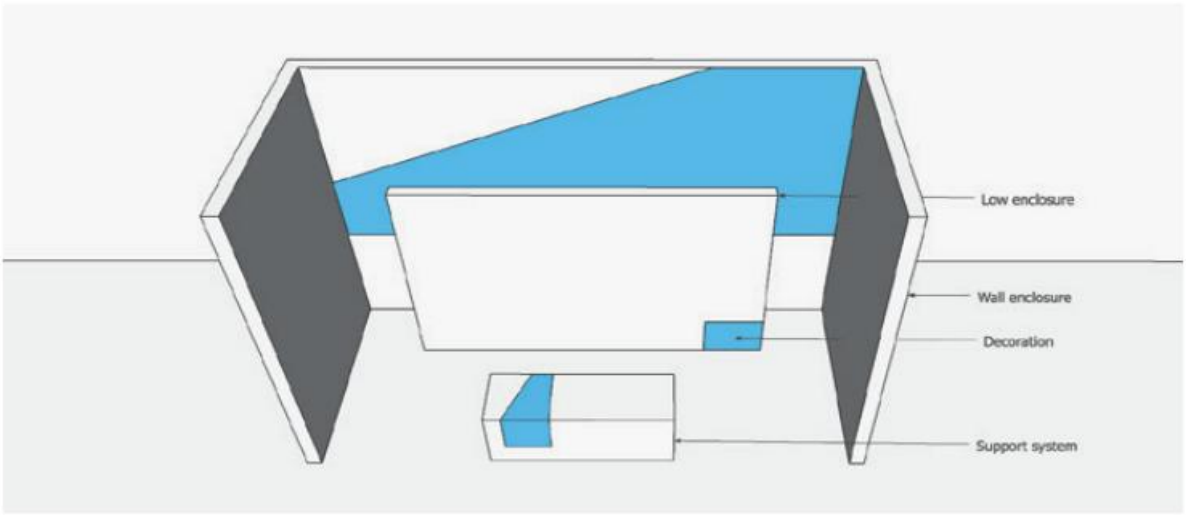

Fig. 3.10 The square family drawing

The project is for a small not-for-profit office company in Manhattan that needed their office space to be as flexible as possible for a constantly fluctuating workforce and a relatively confining office space. Taylor and Miller's solution was to utilise the mechanics of an existing collapsible filing system to create office partitions that actually move to allow for reconfiguration of the offices. They can be configured to allow for up to seven workstations when fully separated and fully unfolded. They can also be configured to collapse completely, allowing precious space for events and larger team-centric workspaces. At a detail level, when occupying the space between two partitions, one can see that the inward faces of each has been excavated

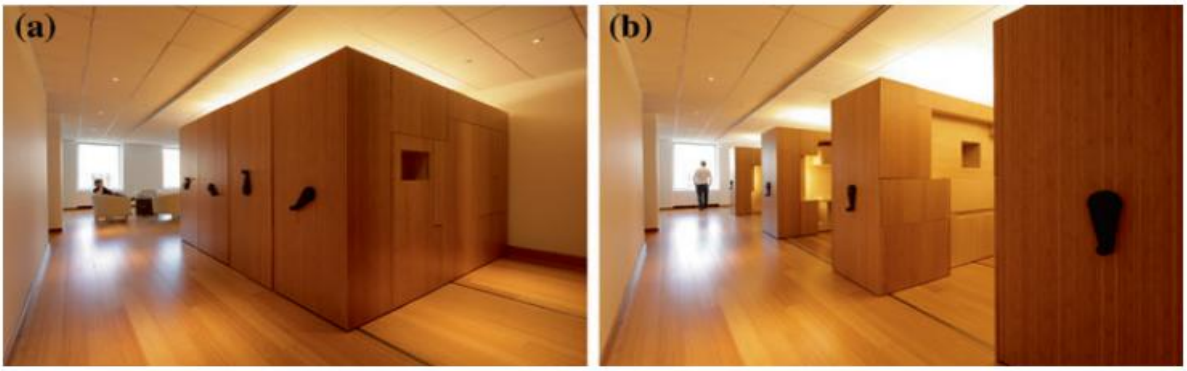

Fig. 3.11 **a**, **b** Environmental Grantmaker's Association offices in New York designed by Architect and fabricator: Taylor and Miller. *Photograph* by Emile Dubuisson, 2013

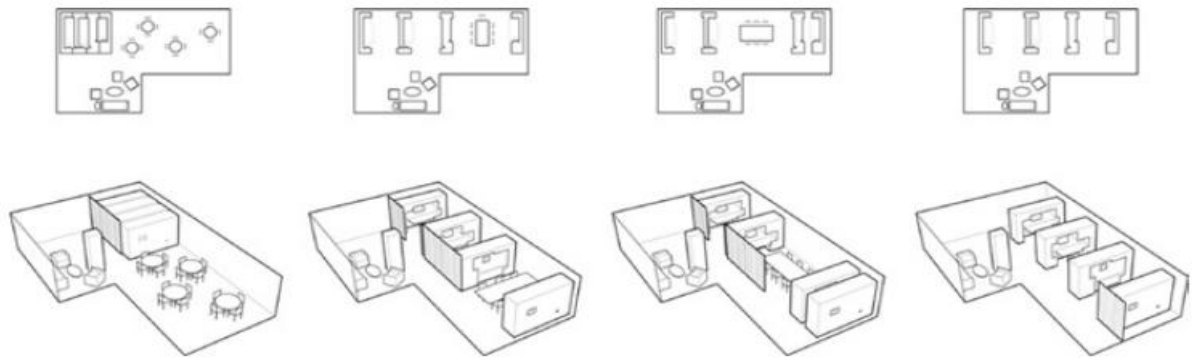

Fig. 3.12 Plans and perspectives showing different arrangements

with the same shape. In other words, what is a storage box protruding on one side is a recessed storage cubby hole on the other. In this manner, the partitions are bound together spatially; the relationship between them becoming stronger and stronger as they are compressed together… until finally they are collapsed completely concealing the carved space within (Figs. 3.11 and 3.12).

3.6.2 The Circle Family

See Fig. 3.13.

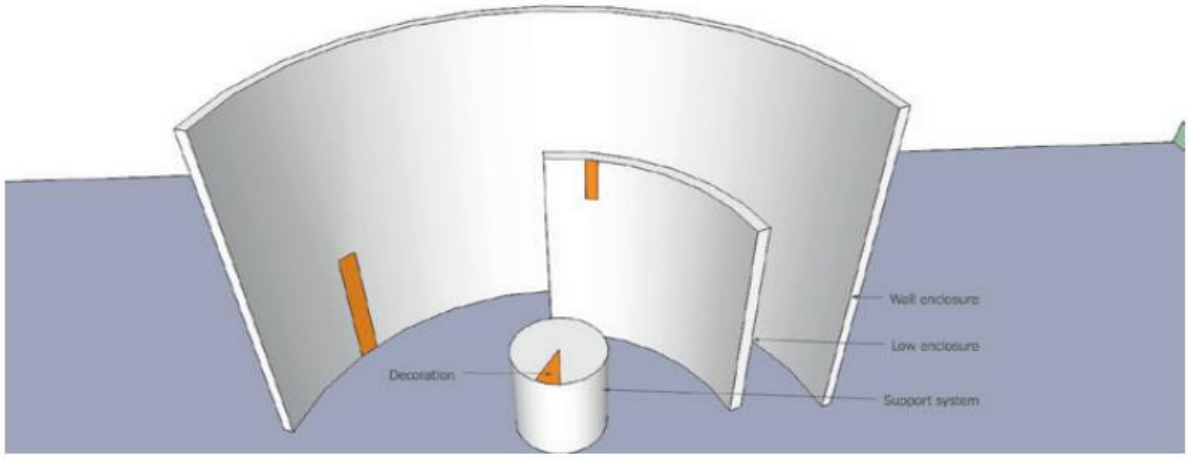

Fig. 3.13 The circle family drawing

A statement from the architects of the Medical Centre in Fig. 3.14: 'The way in which the geometry circulates and unfolds not only promotes an atmosphere of calm, rest and relaxation but in severe circumstances, also prevents children from harming themselves on corners: where this space is concerned, right angles are most definitely the wrong angles'.

Fig. 3.14 Edgecliff Medical Centre, Edgecliff, New South Wales, Australia, designed by Brett Boardman, 2012

3.6.3 The Triangle Family

See Fig. 3.15.

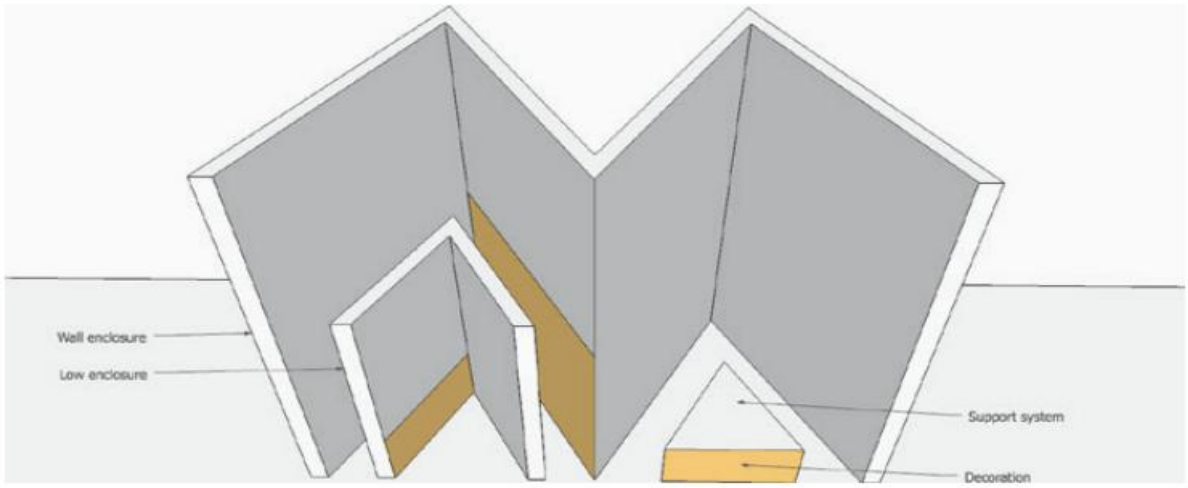

Fig. 3.15 The triangle family drawing

It has to be said that it is unusual for any interior to be planned whereby a corner of two walls meeting would be less than 90°. The use of the equilateral triangle with internal angles of 60° is not intended to demonstrate interior planning but merely shows how angular characteristics form a family.

SkyHouse in Fig. 3.16a–c is a residence constructed within a previously unoccupied penthouse structure at the summit of one of the earliest surviving skyscrapers in New York City. With its steep hipped roof of projecting dormers and chimneys set over a base of enormous arched windows, the exterior of the penthouse gives the impression of an ornate Beaux-Art mansion suspended midway within the iconic vertical cityscape of Lower Manhattan. But this exterior shell was essentially an ornament for the skyline; inside was a raw space with only the original riveted steel structure—amongst the earliest steel frame of any surviving tower in New York—providing evidence of the late nineteenth century when the building was built. The angular interior is a complex series of angled planes reflecting the existing building's structure.

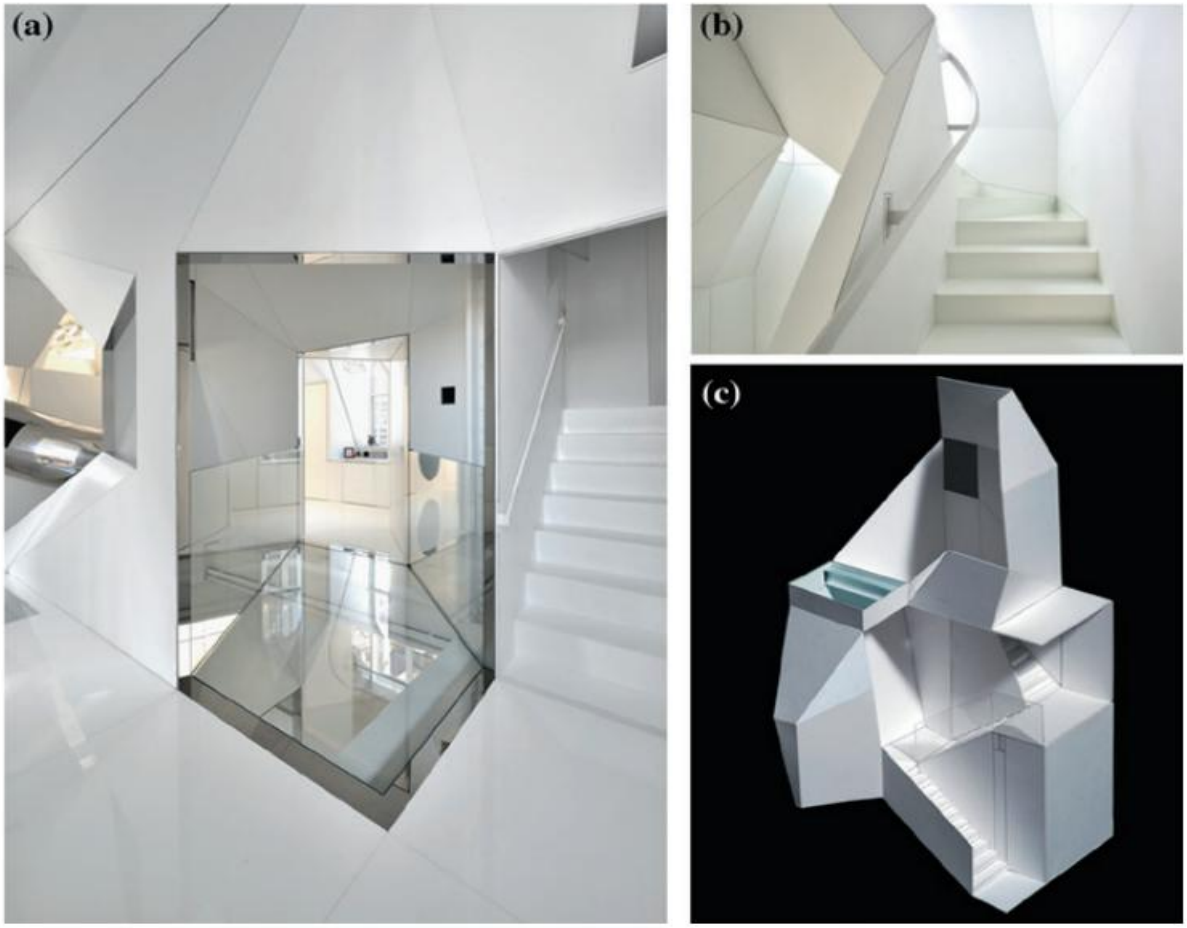

Fig. 3.16 **a**, **b** Skyhouse penthouse, New York, designed by David Hotson architect and interior designed by Ghislaine Viñas, 2013. **c** Skyhouse, 3D model

I am well aware that design is not stereotypically trapped inside these categories, for any 3D concept can be formed from a combination of all of these, because the language of design is free and open. The classification serves as an example of how design can begin with some sort of discipline before all hell breaks loose, and the client throws a fit, or you suddenly shout 'Eureka' and madness descends upon the scheme!

Figures 3.17 and 3.18 show a complete breakaway from the standard hotel double bedroom and how exciting is this! This brave conceptual thinking involves integrating a bed, wardrobe storage, a bath up the stairs, shower and washbasin into one island structure. The angular forms are mirrored in the wall decoration and even the rug.

Fig. 3.17 Edmund Room in Volshotel, Amsterdam, designed by Jos Blom and Jasper Eustace, 2014

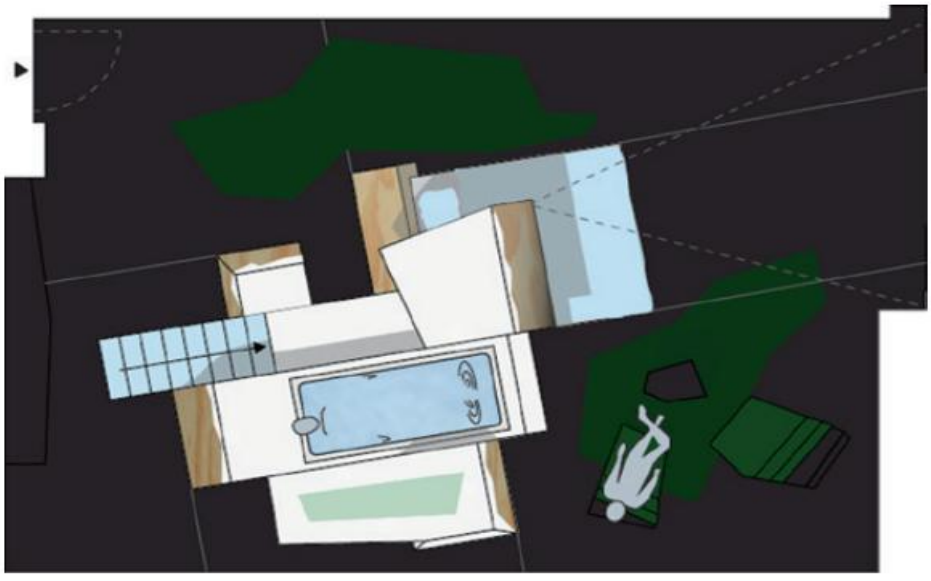

Fig. 3.18 Plan of room

3.7 Junctions and Meeting of Surfaces

In the chapter on planning, I dealt with positioning and orientation of objects in relation to space and the enclosure. The relationship of all 3D forms is not just a question of massing. It is a question of detail that embraces the form of enclosure, support systems, colour and texture. The enclosure is usually composed of walls, floor and ceiling. Their relationship and consequent construction and finish are dependent upon the function of the space. The 3D concept of such a space is determined by this detailed specification. Space and form should be in harmony; the positive (3D form) and the negative (space). It is very easy for designers to be persuaded by the common application of materials from historical derivation to these enclosing elements in such a way that a floor could be thought of as being stone, the walls wood and the ceiling plaster. If these materials enter the designer's mind in the formative stages of a 3D concept prior to it being fully resolved, then this prejudices the growth of the concept.

If we examine the empty Victorian interior in Fig. 3.19, we can see how the plaster cornice provides a way of wall and ceiling to meet. The wooden skirting provides a way for the wall and floor to meet. The window, door and fireplace interrupt the wall surfaces but are provided with a frame that connects them to the walls; such as the doorway has wooden architraves and a pediment over; the

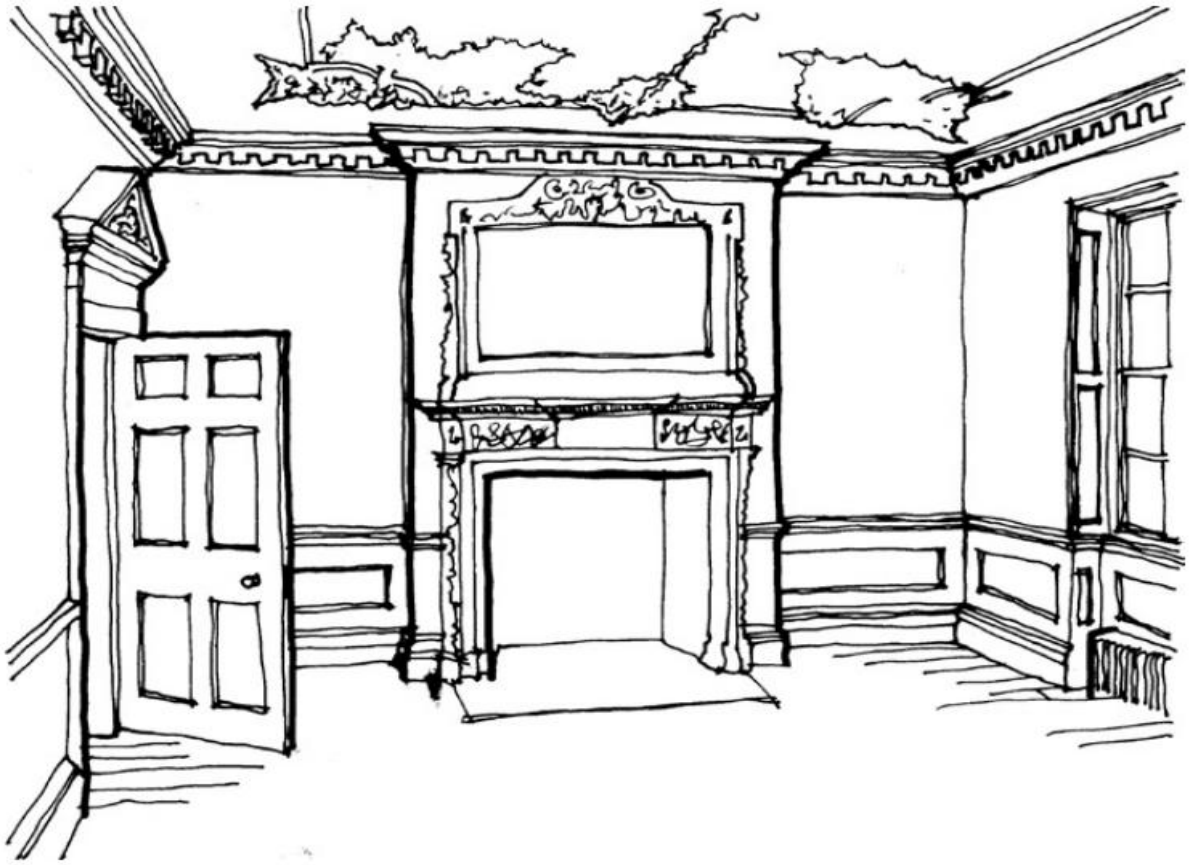

Fig. 3.19 Victorian domestic interior without furniture. Drawn by author

Fig. 3.20 The single cube room, architect John Webb, Wilton House, Wiltshire, England, seventeenth century. *Photograph* by Will Pryce. Copyright Country Life

window has wooden architraves and a sill; the fireplace, which is the main focus of the room, has a decorative frame, frieze and mantelpiece which can be wood or marble. There is a decorative frame above the mantelpiece, which could be reserved for a mirror or painting. Figure 3.20 shows a seventeenth century interior whereby the furniture has similar decorative features to the rest of the room creating a very integrated interior. My analysis of the classical orders on page 154 of my last book explains the kind of reasoning behind the connectivity of these elements. They are what I will describe as being 'integrated'.

The seventeenth century interior in Fig. 3.20 shows how the furniture replicates some of the decorative detail of the walls thus presenting a fully integrated design (See Sect. 3.10).

3.8 The Meeting of Planes

Figure 3.21 explains how the enclosure of a simple box interior can be formulated. The Plain Box interior is probably more of a statement of where interior design is in the current climate with minimalism and simplicity being the key. The Meeting of Planes is presenting this as a design consideration, which I believe has been lost

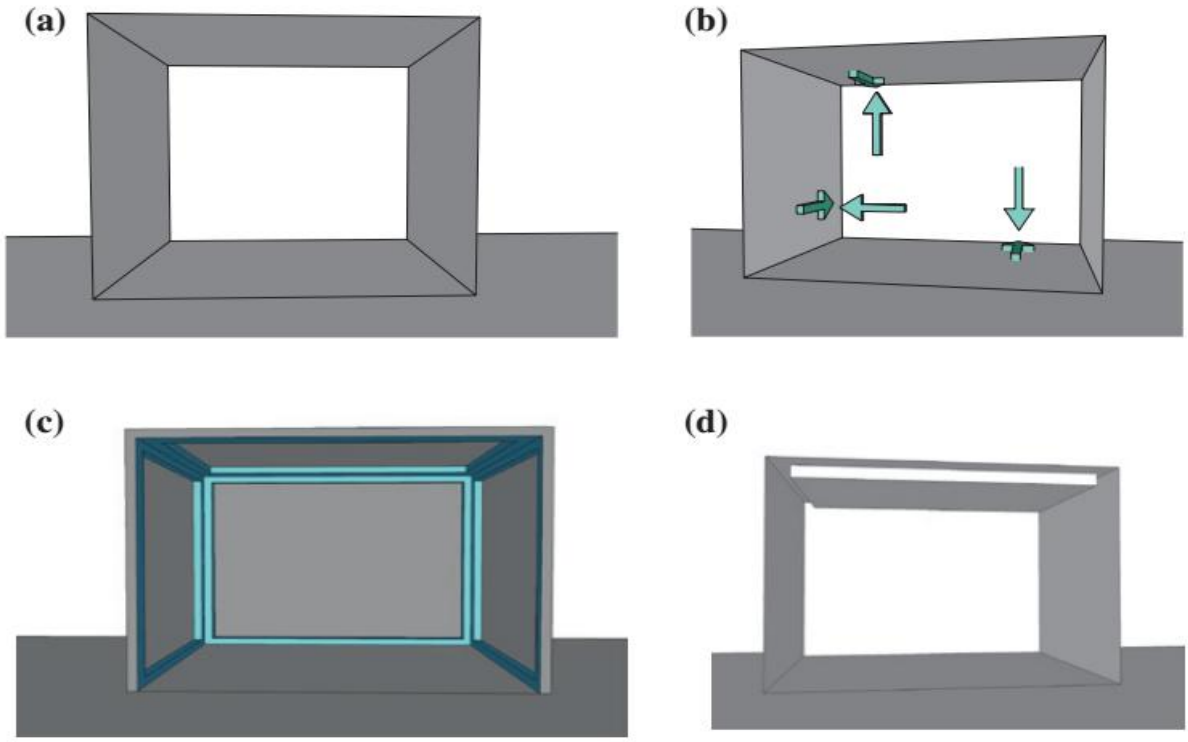

Fig. 3.21 Formulation of the enclosure. **a** Plain box. **b** The meeting of planes. **c** Frames or borders of each wall and ceiling plane. **d** Dropped ceiling

Fig. 3.22 Dropped ceiling by TDP Plasterers Brighton, UK

in the current milieu of technological wizardry and object and material inventions. I am suggesting that designers do not ask the conceptual question of 'How do walls meet?' as other controlling factors governing their meeting, such as structure and materials, have over-ridden such consideration. Frames is emphasising the perimeter of each planar surface and echoes the earlier period interiors. The Dropped (or suspended) Ceiling in Fig. 3.22 is a means of adding another layer beyond the structure and emphasising its isolation or separateness from the remaining enclosure. It has also become a means of defining one part of the space from another.

3.9 The Intrusive Corner

This follows on from my last book as one of many ideas for destroying the 'box' as Frank Lloyd Wright had done by also waging war on the 'box' or 'breaking the box' as he preferred to call it. This reaction is caused over the years by the unquestioning assumption that interiors have walls, floors and ceilings at right angles to each other as a starting premise for any design. The intrusive corner attempts to break the box by providing something that offers far more as I will explain.

The intrusive corner concept (Figs. 3.23 and 3.24) is a direction that I think is worth exploring for the following reasons:

(a) The Plain Box is cold and unwelcoming, whereas the intrusive corner seeks to embrace people and the space by its supportive and directed gesture. The lower support in Fig. 3.23 can provide seating or storage or even display depending on height control.
(b) The upper intrusion is a comfort/containment gesture that aids intimacy but can also provide storage or lighting.

The top drawing of Fig. 3.24 shows how cold and detached the rectangular enclosure is, and yet it is used constantly by designers because of custom and ease of building. The lower drawing shows how the intrusive corner begins to echo our primeval cave-like enclosure.

I AM PROPOSING THAT THE INTRUSIVE CORNER CONCEPT BECOMES A STANDARD PROVISION OR STARTING POINT IN ALL INTERIORS AS OPPOSED TO THE SIMPLE BOX BEING THE STARTING POINT. I THINK IT IS BETTER TO BE CONFRONTED WITH THE PROSPECT OF REDUCING A GIVEN PROVISION AS OPPOSED TO PROVIDING SOMETHING THAT HAS HAD NO THOUGHT FOR THOUSANDS OF YEARS, BUT MERELY REFLECTS UPON A GIVEN BUILDING PROCESS.

By reducing I mean that by starting with the intrusive corner, and the particular function of a given space demands a 90° corner, then a reductive gesture is made.

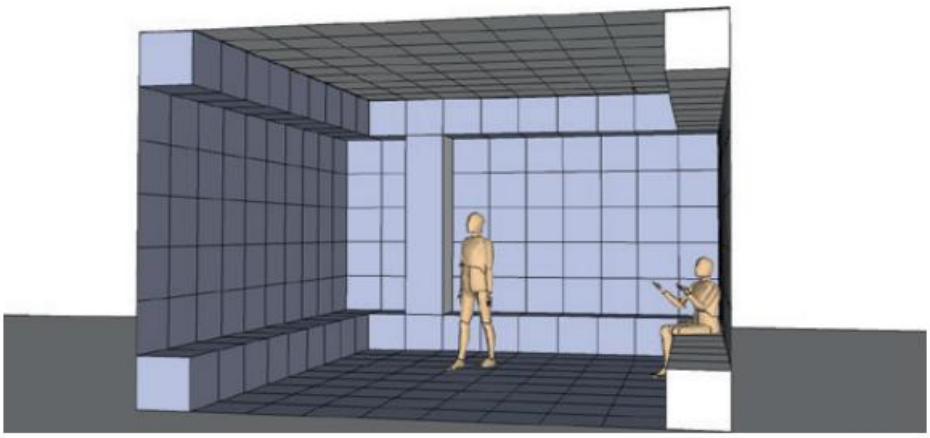

Fig. 3.23 From p. 181 of last book—Intrusive corner concept

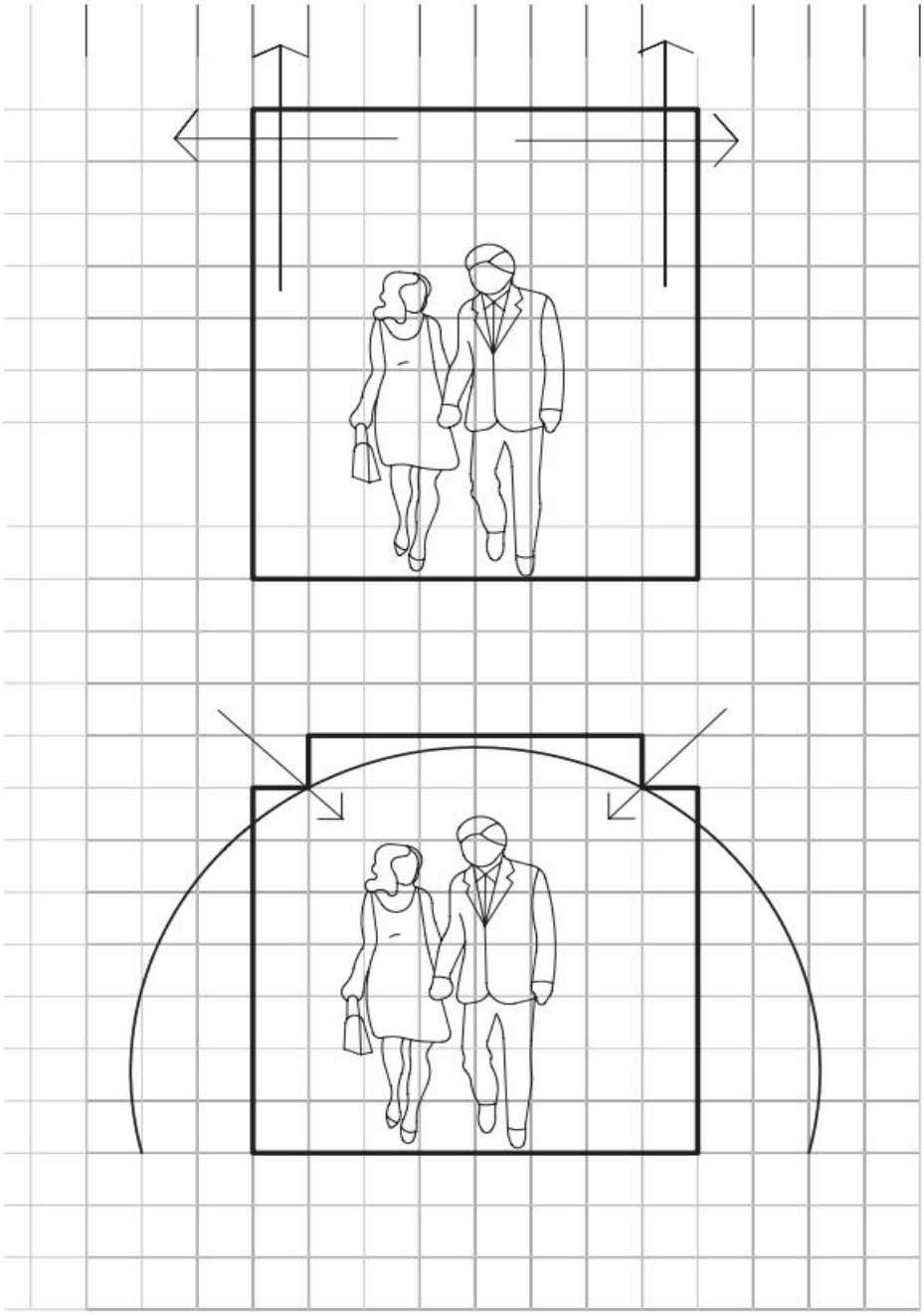

Fig. 3.24 From plain box to intrusive corner

To continue with this theme from my last book, I show a standard 3-bedroom house plan from the UK, as shown in Fig. 3.25, which will be adapted by my proposal using the intrusive corner (Fig. 3.26).

The standard house building technique in the UK has been centred around building walls of brick, block or timber frame. Building services are an 'add-on' and generally result in extra ductwork being applied. Support systems such as storage have been woefully neglected and REDUCED over the years. The demise of the British Parker Morris Standards, which laid down the minimal space-use guide for housing,

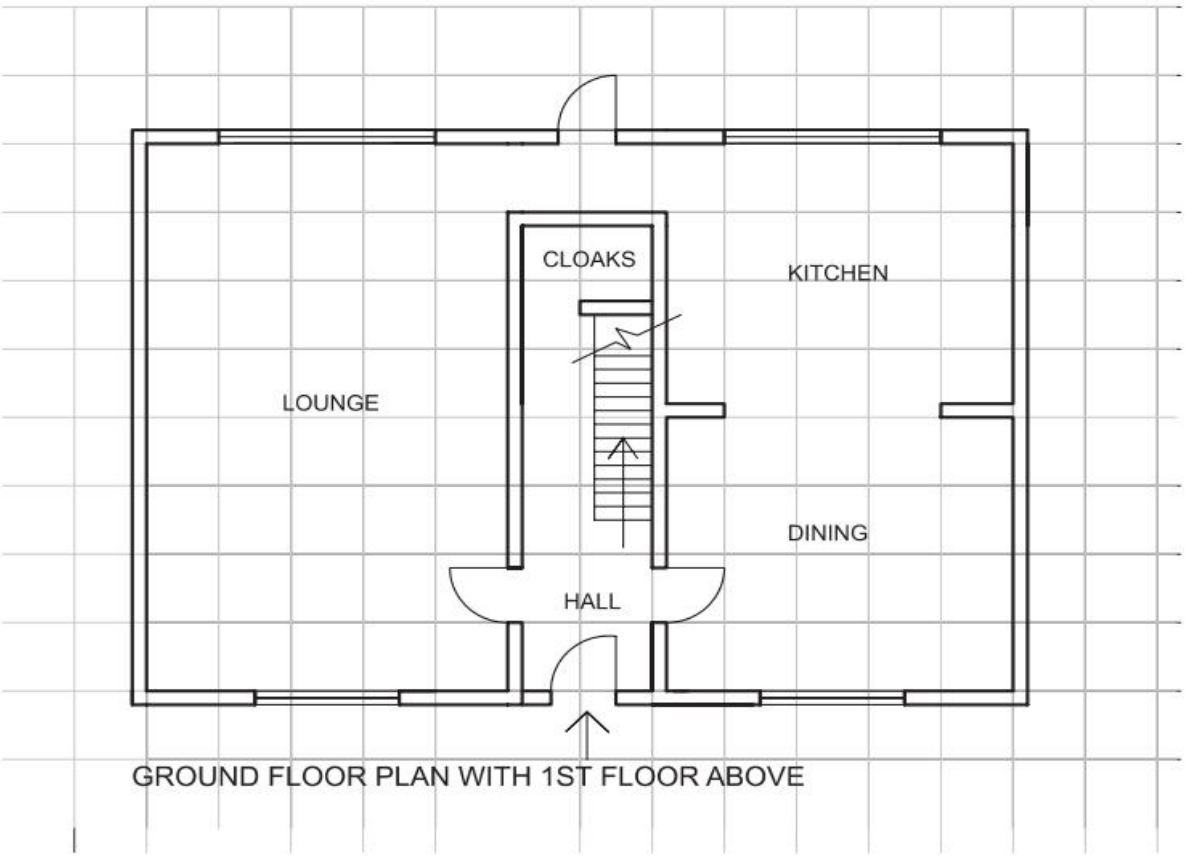

Fig. 3.25 Ground floor plan of standard accommodation in a 3-bed house in the UK

has not helped the situation. The house will have bare walls with the expectation that the occupant will provide all support systems in terms of loose furniture. In Victorian times, many houses were built with cellars, albeit mainly for storing coal, which was delivered through a manhole cover in the pavement outside the front of the house. Most houses had a loft, which was used for storage. Now, many lofts, or roof spaces, are converted to provide extra accommodation thus forsaking the storage space. Even new house designs provide such accommodation in the so-called loft space with dormer windows! As I write, there is much public outcry about house-builders producing 'rabbit hutch' designs and without using an architect. Many houses do not have garages and this compounds the problem. Garages that are provided are used for storage and workshop activities but certainly not for cars! To give you an example, I have visited a few new houses recently and this is what I find is lacking:

1. An understairs cupboard (or just an open space) is the only general storage provision.
2. There is no space for shoes and wellies (back or front of house).
3. There is no hanging space for coats.
4. There is no decent linen storage space apart from a small shelf in the airing cupboard.
5. There is no decent space for ironing, even if a utility room is provided.

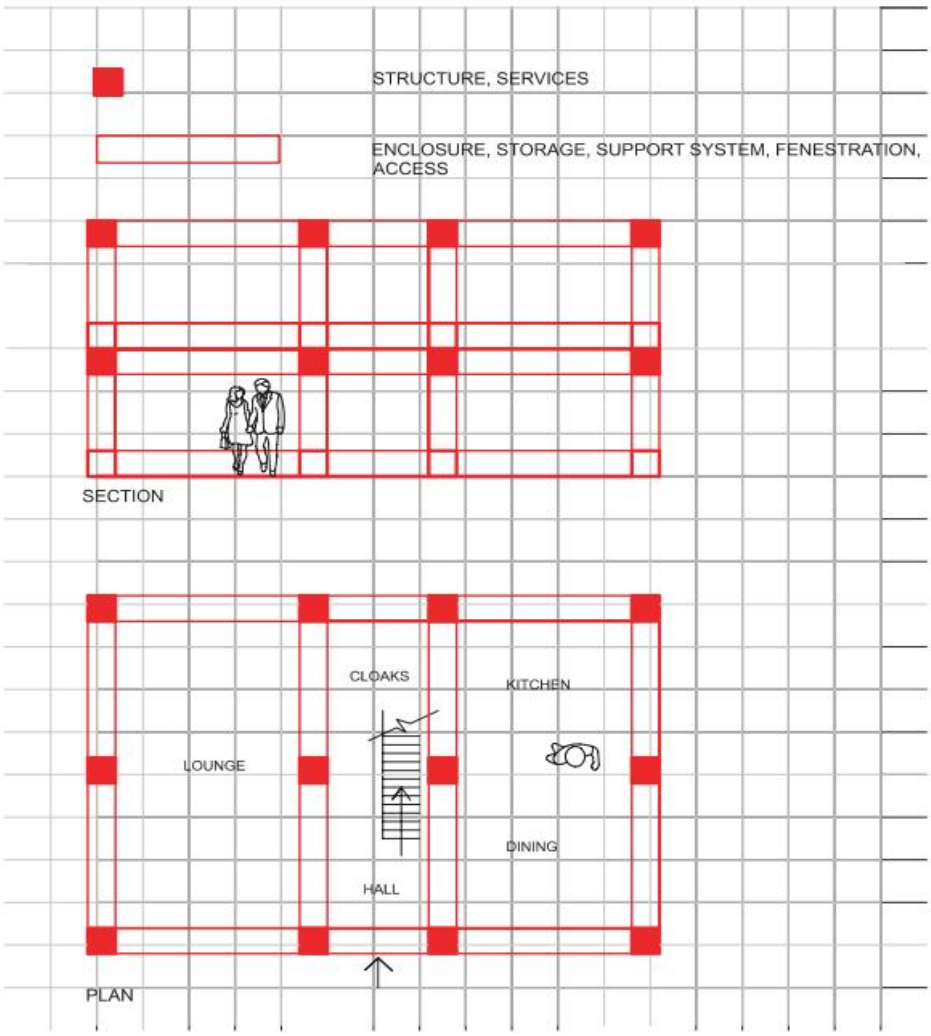

Fig. 3.26 Plan and section grid based on intrusive corner

A wide range of family activities are becoming more personal and individual. At the present time, if someone wanted to carry out an individual task, they would probably use the dining room table, or a kitchen work surface. There is more need for individual cells for working and special provision needs to be made. These areas need not be personalised but open for anyone in the family to use.

Figure 3.26 shows a grid using the intrusive corner as a channel or zone that provides structure as well as providing space for enclosure, storage, work surface, seating, window positioning and door access. This can be achieved by using hinged, sliding and folding panels, with adjustable shelving. This provision, whilst it may take up more floor area than standard houses, will obviate the need for many standard furniture items and allows for flexibility of choice for the occupier. It will also enable spaces to be divided up around the perimeter creating smaller cells of activity that more truly reflect the demands of modern living, than the larger mixed use spaces we are familiar with.

Figures 3.27 and 3.28 show an elevation and perspective of a basic modular ordering system offering permutation of layout and not a finished design solution.

Imagine the sales slogan: NO FURNITURE REQUIRED! Also the basic footprint of the house could be smaller as all storage/work surfaces are perimeter based. If parts of a wall were required to be free of any shelving or storage, then that can be part of the option system. The worktop cell could be replicated and positioned in any room to cater for each member of the family. It does absorb the fairly common storage wall concept that mainly exists in more expensive houses and commercial premises. The standard domestic house mainly consists of a box of plain walls with no other provision of facilities, and now that the ubiquitous picture rail has disappeared there is only the skirting board left to demonstrate a token provision of a facility of wall protection from cleaning equipment and loose furniture.

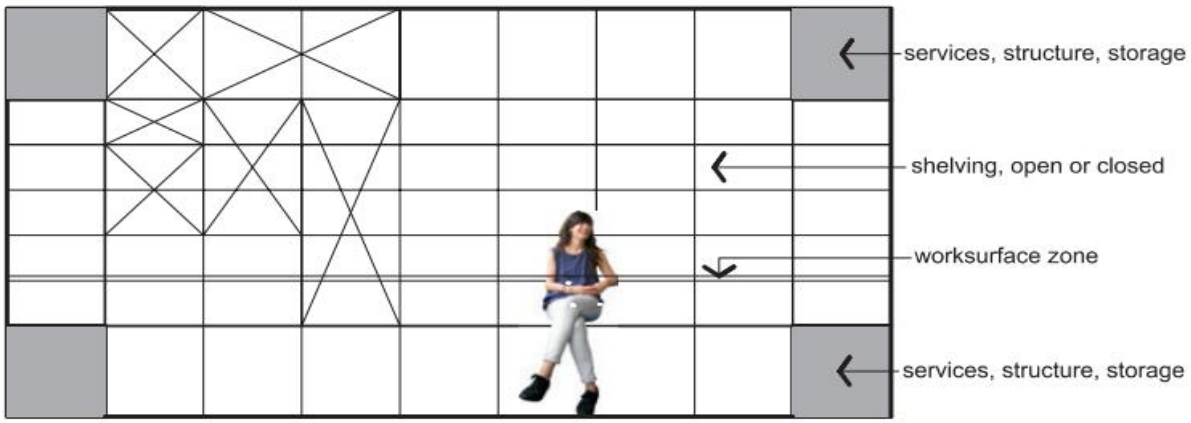
services, structure, storage
shelving, open or closed
worksurface zone
services, structure, storage
ELEVATION OF INTRUSIVE CORNER CONCEPT SHOWING SEATING AND STORAGE OPTIONS

Fig. 3.27 Elevation of intrusive corner concept

Fig. 3.28 Perspective of intrusive corner concept

3.10 Growth of the Integrated Interior

Let us examine how this impoverished situation, as described in the last paragraph, has come about from early architecture to the present day:

3.10.1 Architectural Form

As opposed to Integrated Services, my use of the term 'Integrated Design' as applied to a building is one where the interior reflects the exterior in the form of the external envelope. What you see on the outside is what you get on the inside. Early domed structures such as are prevalent in Moorish architecture seem to have this characteristic, but I have singled out the Hagia Sophia[3] church in Istanbul (Fig. 3.29) as a fine early example whereby the Roman Arch is the binding integrated element throughout from doorways, the column arches and small to large domes. The Taj Mahal[4] and the Mosque at Isfahan[5] similarly have this integrated approach, even if some doorways are rectangular, they are framed by an arch. Curiously, whilst Gothic Cathedrals and churches produced curved vault-shaped

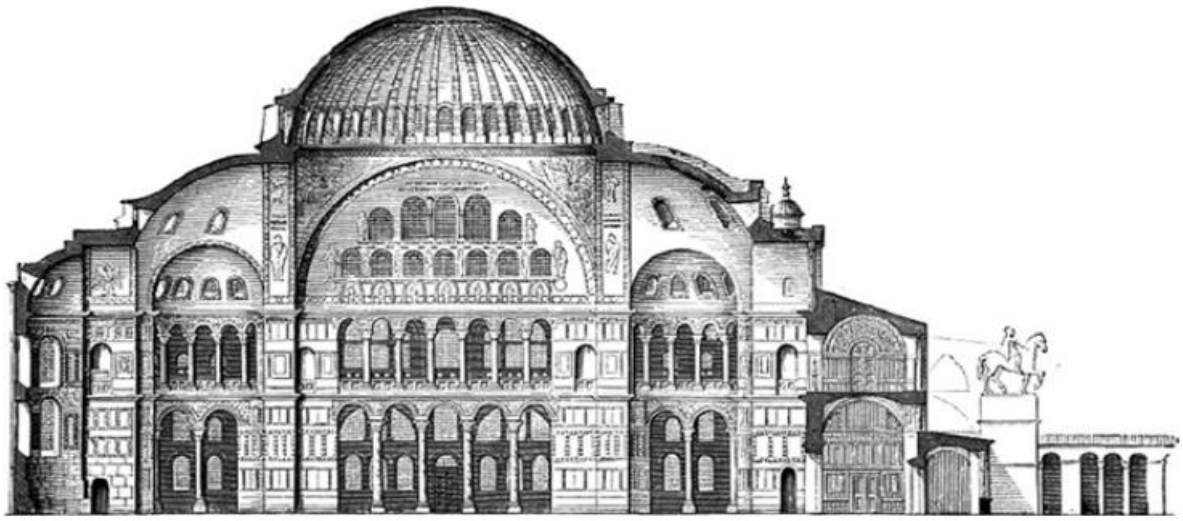

Fig. 3.29 Section through the Byzantine church of Hagia Sophia, Istanbul, 532–537 A.D. From Wilhelm Lübke/Max Semrau: Grundriß der Kunstgeschichte. 14. Auflage. Paul Neff Verlag, Esslingen, 1908; German Wikipedia, original upload 28. Aug 2004 by Rainer Zenz

[3]Santa or Hagia Sophia is a former Greek Orthodox patriarchal basilica (church), later an imperial mosque, and now a museum in Istanbul, Turkey.

[4]It was built in 1632 by Mughal emperor Shah Jahan in memory of his third wife, Mumtaz Mahal.

[5]The origins of this mosque lie in the eighth century, but it burnt down and was rebuilt again in the eleventh century and went through remodelling many times. As a result it has rooms built in different architectural styles, so now the mosque represents a condensed history of the Iranian Architecture.

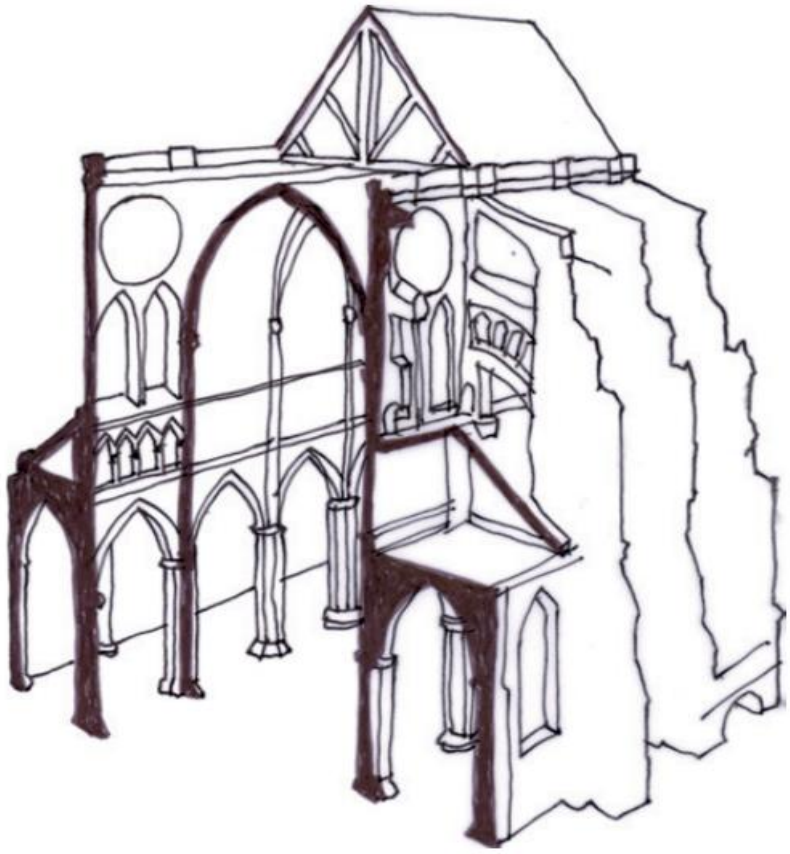

Fig. 3.30 Cross section through Chartres mediaeval Cathedral, France. Drawn by author

interiors, their external roofs were pitched as Fig. 3.30 of Chartres Cathedral illustrates and therefor not as integrated. Some simple English village churches do echo the pitch internally but they will expose the trusses in a decorative manner.

Scanning through the rest of history since the Middle Ages, it would appear that the style of all major buildings is reliant upon their facades and interiors but the roofs have no connection whatsoever (except domed structures) in that they are merely pitched. I cannot find any example of a major building whose exterior roof form is an integrated visual form of the interior, apart from buildings in the Middle East whose flat roofs were built due to the climatic conditions and lack of rainfall—UNTIL the birth of Modernism[6] and the 'Flat Roof' of buildings designed by Louis Sullivan[7] and Frank Lloyd Wright. The flat roof is of course an integral part of the 'boxy' architecture that is so common these days. Other examples of integrated architecture were the great industrial 'sheds' using cast iron such as railway stations and the Exchange Building in Amsterdam of 1897 designed by H.P. Berlage.[8] The next phase of integrated architecture produces projects, which CAD has enabled with such work of Zaha Hadid and Frank Gehry, for example. The 'parametric' interiors are also visibly expressed on the outside. This is what I call 'Freeform' (see Sect. 3.11).

[6]Modern architecture is generally characterised by simplification of form and an absence of applied decoration. It began at the turn of the twentieth century with efforts to reconcile the principles underlying architectural design with rapid technological advancement and the modernisation of society.

[7]Louis Henry Sullivan (1856–1924) was an American architect and has been called the 'father of skyscrapers' and 'father of modernism'.

[8]Hendrik Petrus Berlage (1856–1934) was a prominent Dutch architect.

3.10.2 The Hazukashi House

The Hazukashi House which was completed in 2014 in Kyoto, Japan, presents a very modern Integrated architectural and interior design solution. The pitched roof form is seen in the interior, but the angular shape of this roof is also replicated in terms of doorway openings, spatial wall divisions and even display recesses (Figs. 3.31, 3.32 and 3.33).

Fig. 3.31 Interior of the Hazukashi House. Architects: Alts Design Office, Japan, 2014

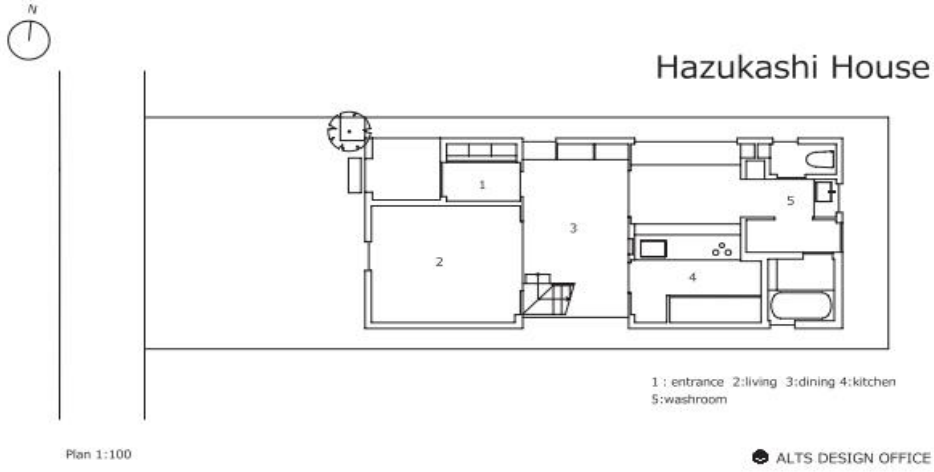

Fig. 3.32 Plan

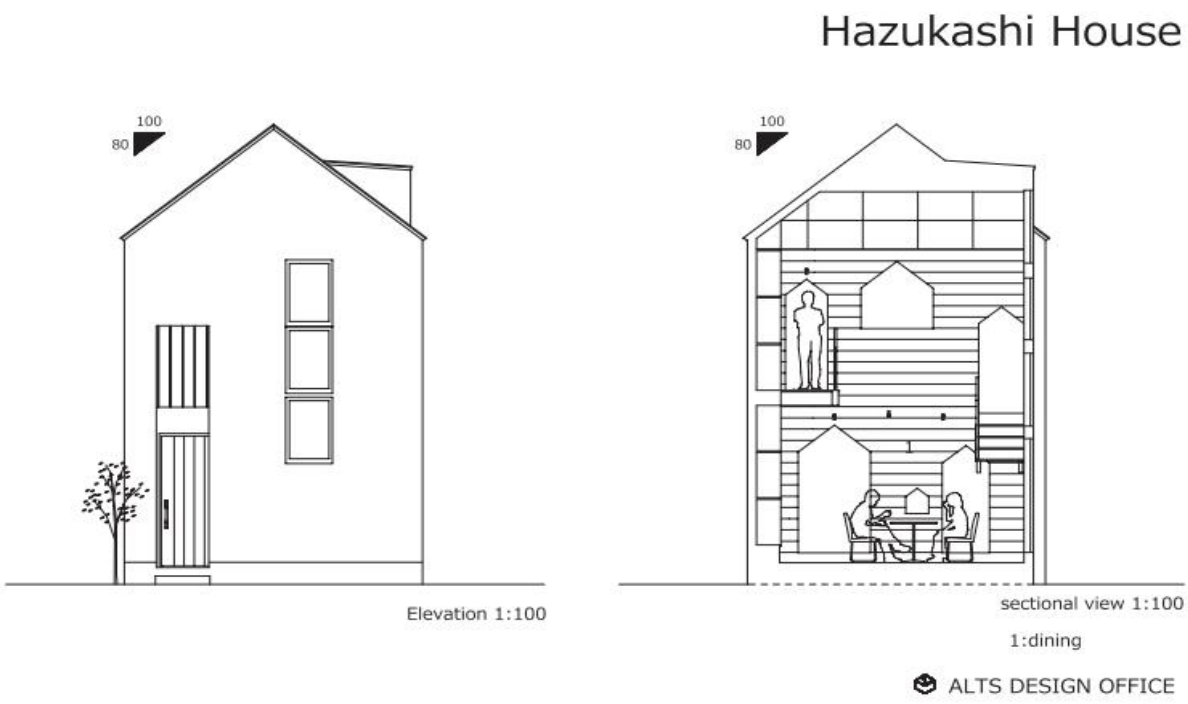

Fig. 3.33 Elevation and section of the Hazukashi House

3.10.3 Interior Form

The development of the integrated interior began with simple decoration and items of furniture:

1. Wall decoration was a human gesture of showing an attachment to the space. And walls, as well as ceilings and to a lesser extent floors, have continued to be a source of important decoration and function.
2. Sophistication appeared from mediaeval times with wall hangings, paintings and wall sculptures.

Fig. 3.34 An Aumbry from St Matthew's Church, Langford, Oxfordshire England. Thirteenth century. Owner Motacilla, Wikipedia Commons, 2010

3. Ornate decorated wall panelling and plasterwork from fifteenth century. Aumbries (see Fig. 3.34) were storage cupboards built in stone recesses or with a timber frame and doors for storing clothes, linen and silver.
4. Apart form eighteenth century libraries such as in Fig. 3.35 with surrounding walls fitted out with shelves, there appears to be no storage provision related to the general activities of interiors. Kitchens (see Fig. 3.36) became intensive cooking workshops and demanded shelving and cupboards. Decorative niches offered a few display possibilities and the space under stairs presented space for storage simply because it was otherwise unusable. Basements and attics are excluded from my analysis as they do not usually represent useable spaces.
5. Interiors continued to rely upon highly decorative wall panelling or decorative plasterwork and mirrors to provide the 'content' of an interior. Fireplaces and doorways were give high prominence. Door surrounds and openings were framed with architraves and various decorative embellishments according to the status of the interior, but this emphasis grew out of how important it was to herald the entrance or exit of people. The fireplace became a symbol of wealth and comfort as it provided much needed warmth and nourishment. The eighteenth century saw window seats offering storage by lifting up the seat top, (Fig. 3.41) and of course furniture became more widely used for all manner of purposes apart from storage and display.

Fig. 3.35 Library of Mellerstain House, Scotland by William and Robert Adam from 1725. Drawn by author

Fig. 3.36 Kitchen in Burghley House, Stamford, England, sixteenth century. *Courtesy* Burghley House

Fig. 3.37 The Dining room from the Library, Sir John Soane's Museum, London, 1812. *Courtesy* the Trustees of the Sir John Soane's Museum

6. Sir John Soane's Museum was a breakthrough in interior design and gave Soane the opportunity to develop ideas that he would apply in later commissions. The design was very complex dealing with space and light in a quite extraordinary way. He could be described as being one of the first modern interior designers. The dining room in Fig. 3.37 demonstrates how he divides space by curved screen canopies coming down from the ceiling and glazed shelving display fixtures integrated into the walls.

Figures 3.38, 3.39 and 3.40 show how storage has been integrated into the structure of the building. The predominance of wood is reminiscent of Tudor times and was very much part of the Arts and Crafts movement whose purpose was to emphasise connections with natural materials. The beauty of wood is that it can be expressed as structure in terms of columns and beams, as well as smaller solid sections and veneered panels for joinery items. There is really not another material that has that kind of versatility in construction and acceptability in function.

Fig. 3.38 The Drawing Room of Blackwell House, Cumbria, UK, designed by MH Baillie Scott in 1901, showing the integrated seating and shelving

Fig. 3.39 Shows the main forces of form that help define the 3D concept. *Courtesy* Blackwell. The Arts and Crafts House. © Lakeland Arts

The notion of built-in implies that it is not moveable. This window seat in Fig. 3.41 is very much part of the architecture of the building and under the seat was sometimes used for storage. Typical modern storage solutions that are built-in and combine functions or are linked to other functions are 'Under stairs', 'Bedroom units', 'Kitchen units', 'Lounge units' and 'Bathroom units'.

Figure 3.42 shows how the combined function approach integrates open-shelf display with an electric fire and a desk. The streamlined aesthetic followed the Art Deco lines of the period. The more recent design of a staircase in Fig. 3.43 is as far removed from the traditional concept as possible, acknowledging that it would

Fig. 3.40 Main Hall at Blackwell House. *Courtesy* Blackwell. The Arts and Crafts House. © Lakeland Arts. *Photograph* by Nick Wood

Fig. 3.41 Window seat in Blackwell House. *Courtesy* Blackwell. The Arts and Crafts House. © Lakeland Arts

Fig. 3.42 London Art Deco Study by Rodney Thomas, 1930s. Drawn by author

Fig. 3.43 Suspended stair, storage and desk system designed by Studio Mieke Meijer from Eindhoven, 2014

not pass safety regulations in the UK. The design is also questionable from the point of view of its function. For example:

1. Why separate the stair into two halves, with the suspended half being so close to connection to the lower half which would reduce the structural strain of suspension?
2. Access to displayed objects at higher level difficult.
3. To work at a desk in such a situation would be stressful to say the least.
4. Having seen my previous images of integrated interiors, this example shows how things go wrong when a multiple functioned design has no relationship with the interior.

Figure 3.44 is such a charming and caring solution towards a household's pet. The 'Dog-house Sofa' unites a dog seat with a person seat in an integrated way that separates whilst at the same time providing a table/armrest. Visual and physical contact with the pet can be made under this surface.

Figure 3.45 shows a living room with open shelving, glass doors to shelves and drawer units all combining as one entity. My one criticism is that the TV is far too high for viewing from a seated position, and yet it appears to be a popular position in many homes. The TV screen should be at eye level as the early bulky models on stands used to be (see left-hand diagram in Fig. 3.46), but since the introduction of the flat screen in LCD or plasma, the ability to hang these on the wall became a reality (see right-hand diagram).

Fig. 3.44 Dog-house Sofa designed by min n mun (www.minnmun.com) 2014

Fig. 3.45 Domestically fitted display and storage units along one wall with a TV screen as central focus. By No.29 Design, Christina Katos, Boston, USA, 2012

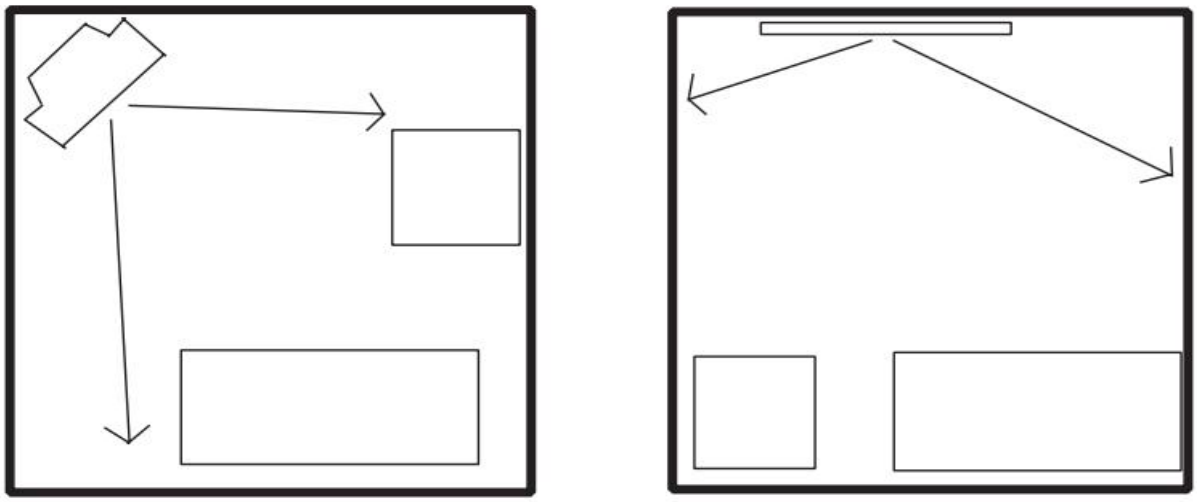

Fig. 3.46 TV position. Drawn by author

The fact that the flat screen has created more floor space has influenced people to purchase huge screens to help create a cinematic effect in the room.

Figure 3.47 shows the foyer of the Millennium Theatre in Cardiff which is a sad indictment of the state of modern public interior design. It is the opposite of an integrated interior, with no focus, no cohesive geometry, and upper levels and stairs appearing to have no relation with the wall opposite. The people seem lost and uncatered for.

The Camper Shoe Store in Fig. 3.48 is a superb example of an integrated interior. It is part of the Square Family with a rectangular enclosure, rectangular support systems, such as the central white display table almost mimicking a dinner setting, and the red service counteracting as a powerful focus. The beauty of this 3D design is how the shoe was the starting concept as a small component of the interior to be displayed

Fig. 3.47 Millennium Theatre, Cardiff, Wales. Architects, Percy Thomas Partnership. 2002. *Photograph* by author

Fig. 3.48 Camper Shoe Store, New York, 2014. Designed by Oki Sato of Nendo, Tokyo, Japan. *Photograph* by Daici Ano

and subsequently sold. It is replicated by hundreds of white resin dummy shoe displays which are replaced by an actual shoe when it suits the store. The wall layout is not just a simple vertical square grid but a diagonal square grid that increases the attachment of the displays. This dotted aesthetic is repeated in the rows of spotlights.

3.11 Freeform

In addition to the previous three families of form, I have described there is one more that reflects the computer age we live in, namely Freeform. There are many examples of 3D geometry that defy symmetry and the traditional rectilinear shapes that we are most familiar with. A common label of this work is Deconstructivism[9] (see p. 92). On the one hand, there is the work of Frank Gehry[10] and Daniel Libeskind[11] and on the other is the highly fluid architecture of Zaha Hadid.[12]

3.11.1 Case Study 5

HEYDAR ALIYEV CENTER designed by Zaha Hadid Architects 2012.

Baku's Heydar Aliyev Centre in Fig. 3.49 is a national symbol for Azerbaijan, a catalyst for regeneration, and, in the broadest sense, a regional showpiece. The mixed-use centre, designed to become the primary building for the nation's cultural programmes, breaks from the rigid and often monumental Soviet architecture that is so prevalent in Baku, aspiring instead to express the sensibilities of Azeri[13] culture.

This design is probably one of the most fluid, plastic and organic examples that override all previous architectural principles of form and construction in history. The computer-aided design programmes used have enabled such fluid concepts of form come to fruition. The actual specification of the structure denotes previously acceptable components, such as a space frame and cladding panels, and vertical planar glazing walls. But it is the twisting geometric realisation, using these accepted norms, that is breathtaking (Fig. 3.50).

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[9]Deconstructivism is a development of postmodern architecture that began in the late 1980s. It is influenced by the theory of 'Deconstruction', which is a form of semiotic analysis. It is characterised by fragmentation, an interest in manipulating a structure's surface or skin, non-rectilinear shapes which appear to distort and dislocate elements of architecture, such as structure and envelope.

[10]Frank Owen Gehry is a Canadian-American Pritzker Prize–winning architect based in Los Angeles, USA.

[11]Daniel Libeskind is an American architect, artist and set designer of Polish Jewish descent.

[12]Dame Zaha Mohammad Hadid, DBE, is an Iraqi-British architect. She received the Pritzker Architecture Prize in 2004—the first woman to do so—and the Stirling Prize in 2010 and 2011.

[13]The Azeri culture of Azerbaijan has developed under influence of Islamic and European cultures, Iranian and Turkish heritage as well as Russian influences due to its former status as a Soviet republic.

Fig. 3.49 Exterior of Heydar Aliyev Center, 2012. *Photograph* by Iwan Baan

Fig. 3.50 The interior reveals a new type of enclosure where floor, wall and ceiling are a continuous surface. *Photograph* by Hufton and Crow

Here is a statement from the architects' information sheet:

Structure

MERO double-curved space frame structure supporting solid external and internal envelope: MERO KK system (Fabricated by MERO-TSK Germany) made of solid steel ball nodes and CHS members.

External skin

Solid external skin: Fiberglass reinforced polyester rain screen cladding panels to roof higher than datum at approximately 3 m above ground level. Arabian Profile. Color match with off-white fiberglass reinforced concrete panels achieved by using a gelcoat layer with special mixture for visible faces.

The space frame system enabled the construction of a free-form structure and saved significant time throughout the construction process, while the substructure was developed to incorporate a flexible relationship between the rigid grid of the space frame and the free-formed exterior cladding seams.

One visual breakthrough with tradition is the apparent merging of the curved structural skin with the ground seemingly enabling anyone to walk up and over the building, although I am assured by one engineer, that there are safety measures put in place to prevent that occurring. The interior enclosure I would describe as being 'parametric'. Interestingly, Hadid has just launched the design of some swimwear, which she has called 'parametric' because of the flowing lines within the design. The contrast between the complex skeletal structure and the smooth cladding system could not be more extreme. I suppose that this follows the progress over the years from early exposure of the workings of a product such as the motor car or train engine, whereby the mechanical working parts were all exposed, to the gradual sleek cladding of such parts, hidden to the point of visual obliteration. In architecture, we have the Bauhaus[14] teaching of honesty in the use of materials and structure, and Louis Sullivan's famous aphorism 'Form Follows Function', whereby this 'Functionalism' was encouraged to reject ornament by exposing structure and use it as a visual quality in the design. The HA center is the antithesis of this crusade by expressing the form but concealing the bones of the structure by cladding, and marks a new development in this modern progressive architecture (Fig. 3.51).

3.11.2 Grotto Sauna

Perched at the north-west edge of a private island near Toronto, Canada, the Grotto Sauna in Fig. 3.52 is a sculpted space, a sensual experience, and a sophisticated exercise in building science.

[14]Bauhaus, was a school in Germany that combined crafts and the fine arts, and was famous for the approach to design that it publicised and taught. It was founded by Walter Gropius in Weimar, Germany from 1919 to 1933.

Fig. 3.51 View during construction. *Photograph* by Luke Hayes, 2010

Fig. 3.52 Interior of Grotto Sauna, Toronto, Canada. Designed by Partisans, 2014

The site is a prehistoric large-scale rock formation, and the concept prescribed a solid, simple presence on the exterior, whilst the interior follows dynamic air movements in curvature forms. Challenging the standards of current practices in the construction industry, the architects worked directly with a millwork and steel fabrication partner on every detail. They developed a new process of fabrication—utilising state-of-the-art 3D technology to scan, model and build the Grotto.

Using timber in such a fluid and organic way demands far more complex working than using it in panel or member form. The end result is a comforting womb-like container that is far more relaxing than the normal sauna box solution.

3.11.3 The Deconstructed Interior

The early Deconstructivists in design terms, such as exemplified by the work of Bernard Tschumi,[15] Peter Eisenman[16] and Frank Gehry from the early 1980s, were inspired by the writings of philosopher Jacques Derrida.[17] The fragmentation of established built forms was first seen in the work of the Dutch architect Rem Koolhaas[18] and his practice OMA (Office of Metropolitan Architecture), within which Zaha Hadid was a partner. Derrida saw deconstruction as a challenge to unquestioned assumptions of the Western philosophical tradition. The keyword here is challenge, which reveals the revolutionary posture Derrida maintains. I do not want to get involved in the huge philosophical debate here as it is well covered by other writers, but I do want to extract the essence of this movement and how it has affected interior design.

So far we have examined how the 3D concept can be formulated following certain logical geometric principles, whereby a line has a beginning, a middle and an end, and connections can be seen to be joined and articulated. The deconstructivists destroy this reasoned world by applying opposing principles which have been formulated out of dissatisfaction with this social stability and because they see that it denies human growth through imprisonment of real feelings. To quote Tschumi:

Architecture is not about the conditions of design but about the design of conditions that will dislocate the most traditional and regressive aspects of our society and simultaneously reorganise these elements in the most liberating way, so that our experience becomes the experience of events organised and strategized through architecture.[19]

Unfortunately, many of the earlier deconstructed architectural projects have not been successful, due to the fact that not only were their technological issues with the construction, but they were not accepted by the user because of the

[15]Bernard Tschumi is an American architect, writer and educator, commonly associated with deconstructivism.

[16]Peter Eisenman is an American architect and academic.

[17]Jacques Derrida, (1930–2004) was a French philosopher, born in French Algeria. Derrida is best known for developing a form of semiotic analysis known as deconstruction. He is one of the major figures associated with post-structuralism and postmodern philosophy.

[18]Remment Lucas 'Rem' Koolhaas is a Dutch architect, architectural theorist, urbanist and Professor in Practice of Architecture and Urban Design at the Graduate School of Design at Harvard University.

[19]Bernard Tschumi, *Architecture and Disjunction* (Cambridge, Massachusetts, and London, MIT press) p. 259.

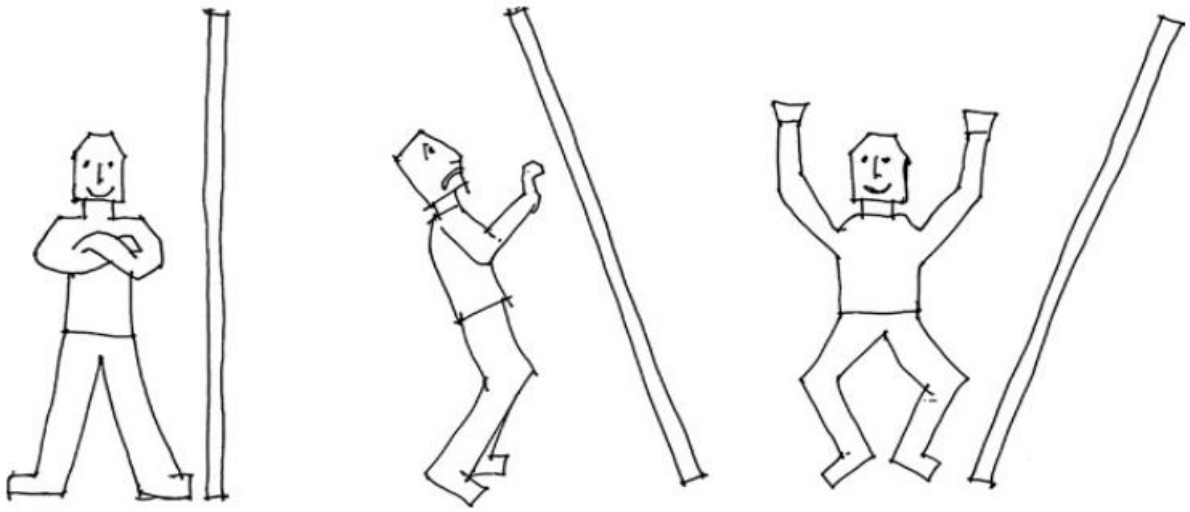


Fig. 3.53 Effect of angled walls on people. Drawn by author

buildings just did not work. Gehry has often been criticised for producing wasteful 'Functionless Forms'.

My sketch in Fig. 3.53 illustrates very simply the basic effect such forms can have on people and whilst I am advising caution I do accept that some projects have appropriate justifications: the left-hand image represents the normality of the vertical as a stabilising influence (both sides) that creates a certain security, and this cannot be ignored by designers. The middle image demonstrates (one sided) the instability created by forms that appear threatening rather than inviting. The final image is a kind of reversal of the middle (one sided) but would create some degree of emotional release from the severity of the vertical. It is curious that all forms of building since primitive times have been preoccupied with the first two illustrations only, according to my own experiences. The third illustration does exist in the form of the hull of boat interiors, albeit curved (Fig. 3.54).

Fig. 3.54 Section through small boat

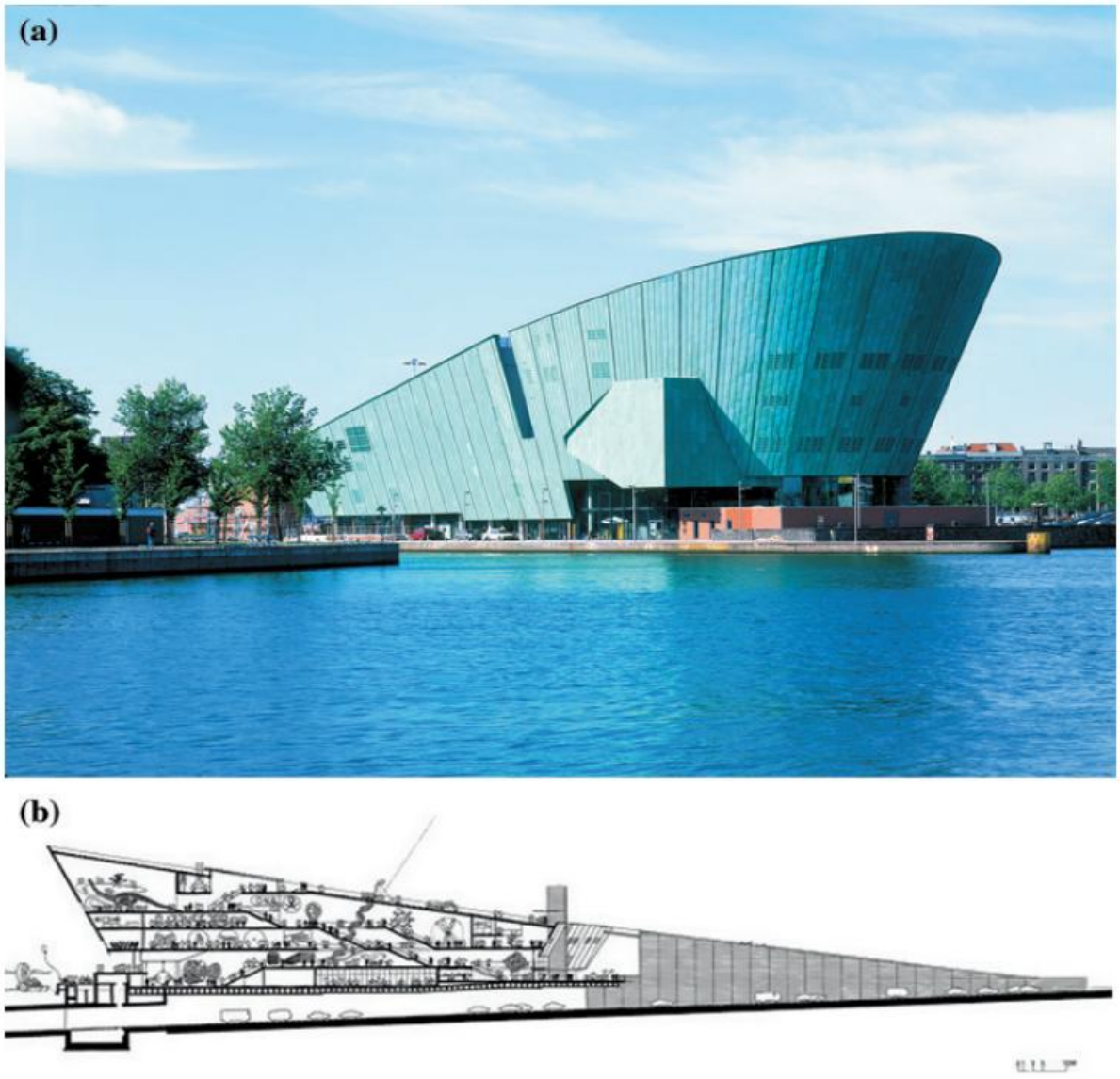


Fig. 3.55 **a** 1992–1997 NEMO (National Center for Science and Technology) Amsterdam, The Netherlands, Renzo Piano Building Workshop, architects, Ph. Michel Denancé (*courtesy* Fondazione Renzo Piano). **b** 1992–1997 NEMO (National Center for Science and Technology) Amsterdam, The Netherlands, Renzo Piano Building Workshop, architects, section (*Courtesy* Fondazione Renzo Piano)

But curiously this womb-shaped, cocooned and cosy enclosing form has not been employed to any great degree in building interiors. The form of the boat is following its function of being capable of floating, which is not a function associated with buildings. Even so, when trying to adopt such a curve to a building poses some design issues as to practicalities of use in the interior and a possibly unwelcome approach from the exterior. The Renzo Piano Building Workshop's design for the NEMO (National Centre for Science and Technology) in Fig. 3.55a, b built on the port of Amsterdam comes close to such a concept as it is definitely inspired by the hull of a boat. Consultants: Ove Arup & Partners, D3BN (structure); Ove Arup & Partners, Huisman & Van Muijen B.V. (services); Peutz (acoustics); and Bureau voor Bouwkunde (local support).

Fig. 3.56 Exterior of the National Museum Café in Canberra designed by Ashton Raggatt McDougall, 2013

Another project that comes close to this theme is the National Museum Café in Canberra. In Fig. 3.56, the exterior is unwelcoming and threatening according to my second sketch in Fig. 3.53, but it would appear that people do not have to approach these angled exterior walls for entry. Also, the angled fins help to alleviate the hostility of a continuous surface. The interior view certainly invokes the feelings displayed in my third sketch in Fig. 3.46, of relaxation and calm, both on the window side and the server side. The pitched ceiling in Fig. 3.57 is less oppressive than a horizontal one and hence is supportive of calm.

The Metropolis Recording Studios in Fig. 3.58 was a tour de force in applying similar principles of disintegration but these were measured, mixed and controlled to not only satisfy the user but also to acknowledge, as Powell-Tuck states: *Its an interior with the ghost of what went before.* The 'ghost' referring to the building's original use as a power station designed in 1901. The interior consists of wall parts in angled layered panels (referring to the acoustic panels in the recording studios) and plans of room shapes at disjointed angles.

The Birkbeck Centre in Fig. 3.59 is another example of not only defying stable geometry in favour of unnerving angles, but also delivering an onslaught of colour that is such an uncommon experience for people, compared with the muted tones of white, greys, browns and pastel colours that are more of a common experience. The scheme would appear to match the dynamics of the image making industry of the user.

This house in Kyoto is part of the Triangle family and the interiors are beautifully triangulated. The excellent perspective shows a structural skeletal framework within which the triangulated panels interconnect (Figs. 3.60 and 3.61).

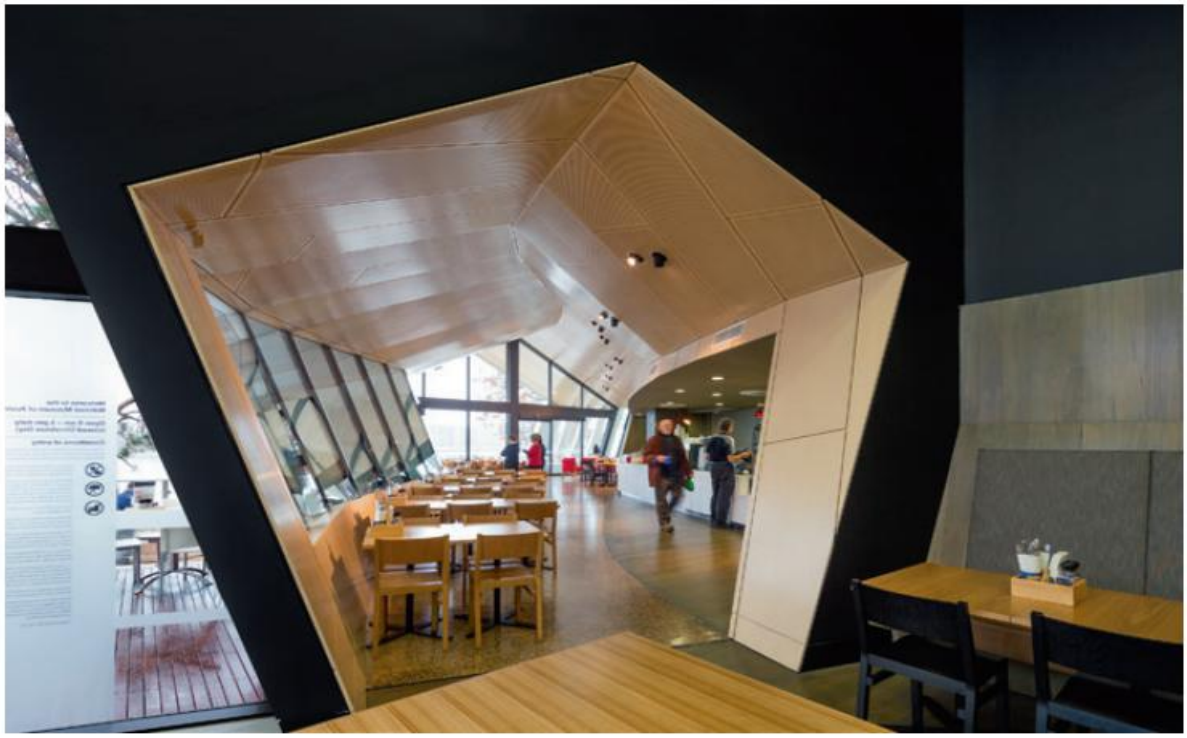


Fig. 3.57 Interior of the National Museum Café in Canberra designed by Ashton Raggatt McDougall, 2013

Fig. 3.58 Metropolis Recording Studios, London, UK, by Powell-Tuck, Connor and Orefelt, 1990

Fig. 3.59 Birkbeck Centre for Film and Visual Media Research, London University, London, UK. Designed by Surface Architects, 2007

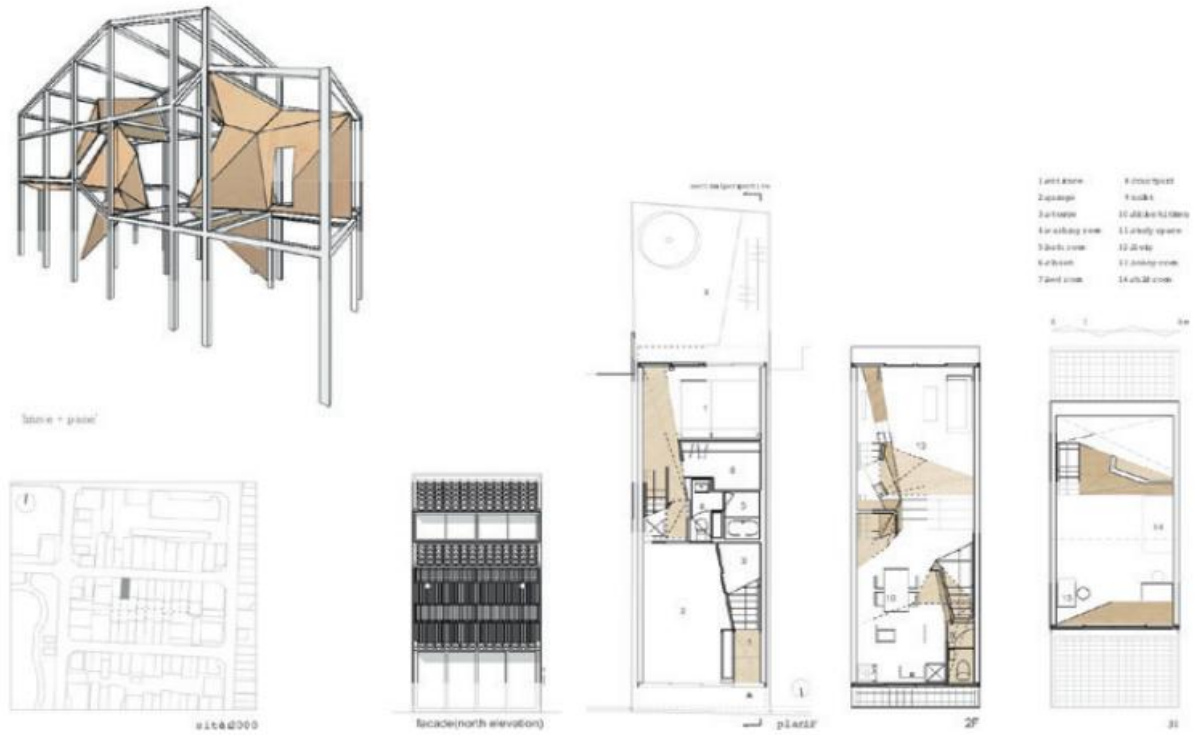


Fig. 3.60 Drawings of a Townhouse in Kyoto, Japan, designed by Alphaville architects, 2010

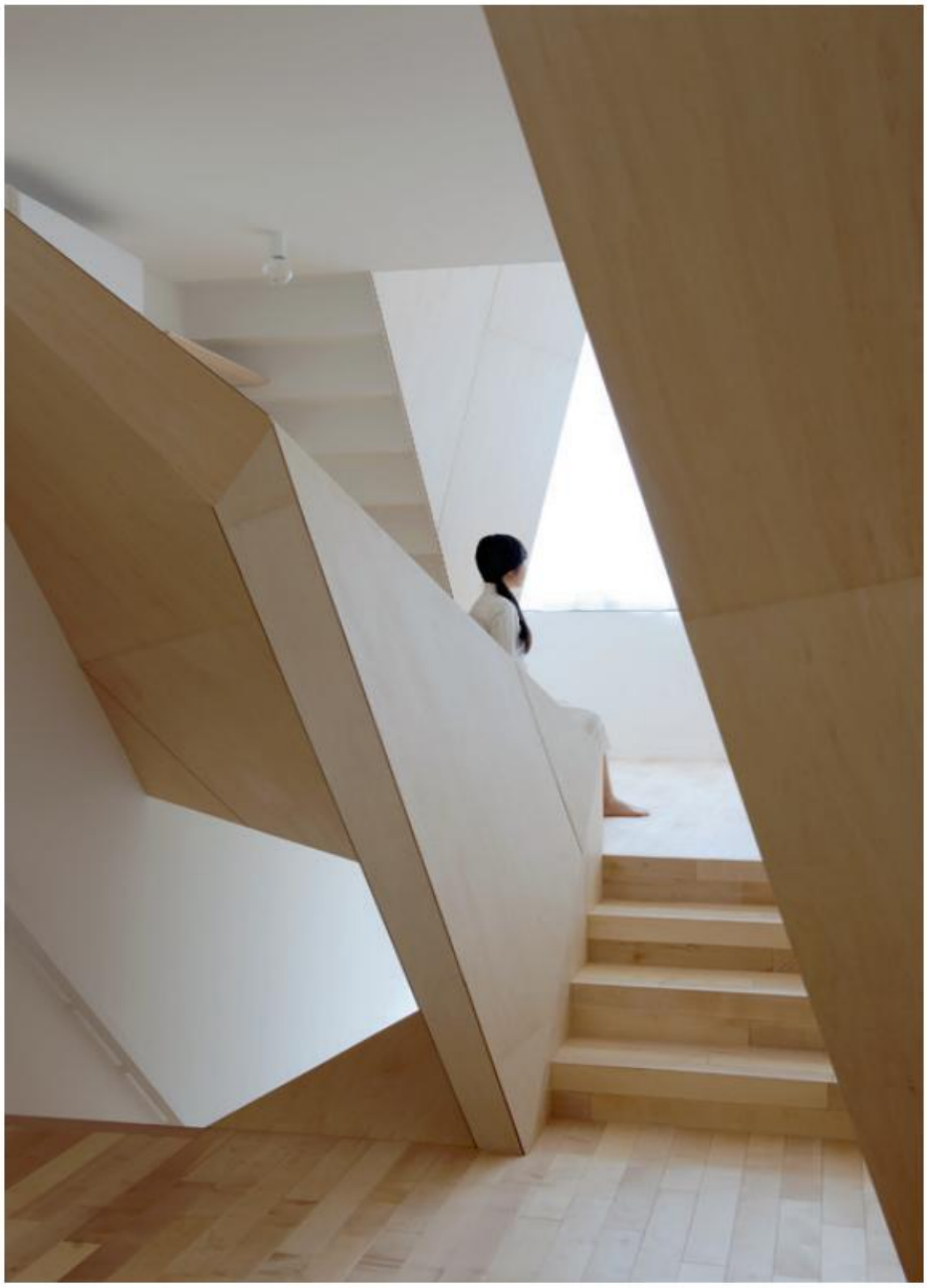


Fig. 3.61 Interior of Townhouse in Kyoto, Japan. *Photograph* by Kei Sugino, Kentaro Takeguchi

3.12 Is Minimalism the Disintegrated Interior?

However, pure Minimalism and the imposition of strict order and regulation is a limited taste.[20] **Clive Edwards**

Minimalism grew out of the early modernist aims of the 'cleansing' of the excesses of Victorian design with its highly decorative content, culminating in the

[20]Clive Edwards, *Interior design, A Critical Introduction* (Oxford, Berg, 2011) p. 48.

'Bauhaus' school of design. Its purpose was to aim for a purification of space and form using materials without any adornment. When applied religiously, it can produce a sense of calm because the human eye is not faced with a clash of issues nor a visual onslaught that could be construed as disturbing. Deconstructivism has passed it by as the main rules appear to follow the horizontal and vertical with unparalleled zeal. On the one hand, this environment was considered to be a sign of high status and still many clients believe this to true. On the other hand, it can result in such a clinical atmosphere that the human soul is starved of warmth and comforting gestures, and this concurs with my own view. Associations with harsh environments such as prisons, hospitals, factories and warehouses can be made. My main criticism of this style is that it represents a denial of human expression whereby the human senses are robbed of the physical variations of stop, pause, flutter, rollover, jump, bang and slide that affect our emotions.

This domestic interior in Fig. 3.62 is so bland, cold and clinical. This is because the designers have pursued the modernist and minimalist principles to the extreme, forgetting that a home is not necessarily a homage to the designer. Now, the client

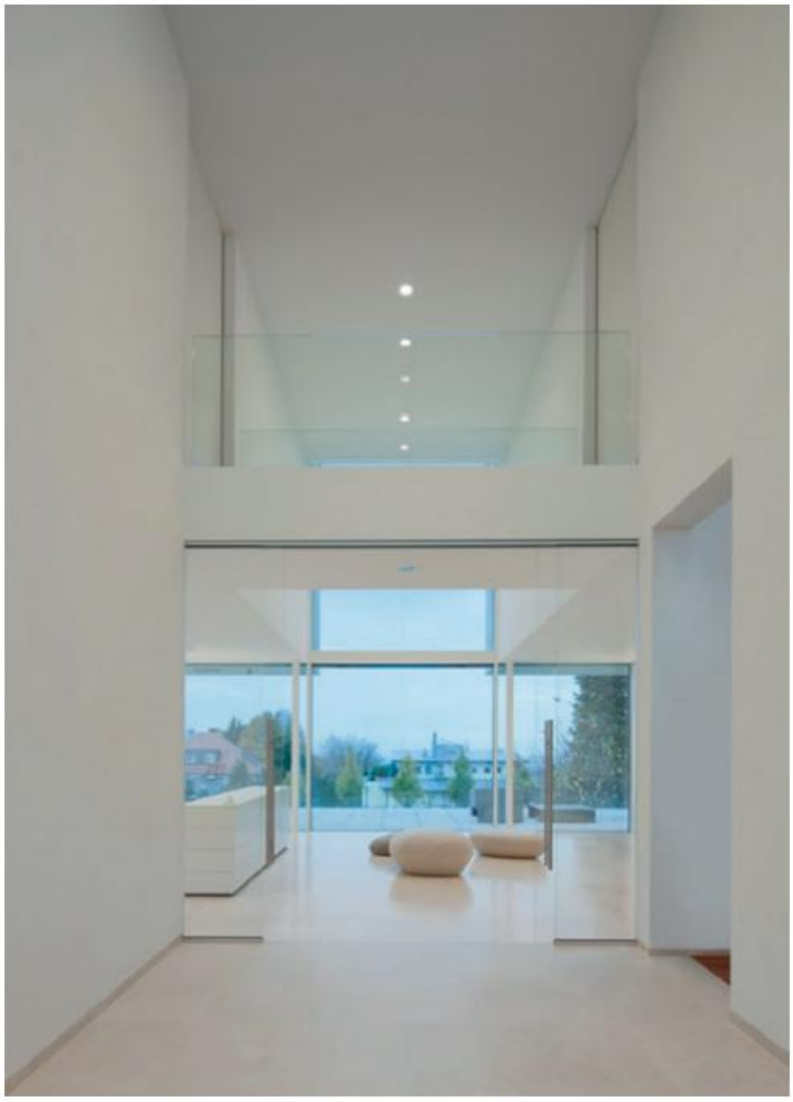


Fig. 3.62 Weinheim House interior, designed by Architekten Wannenmacher + Möeller, Weinheim, Germany, 2014

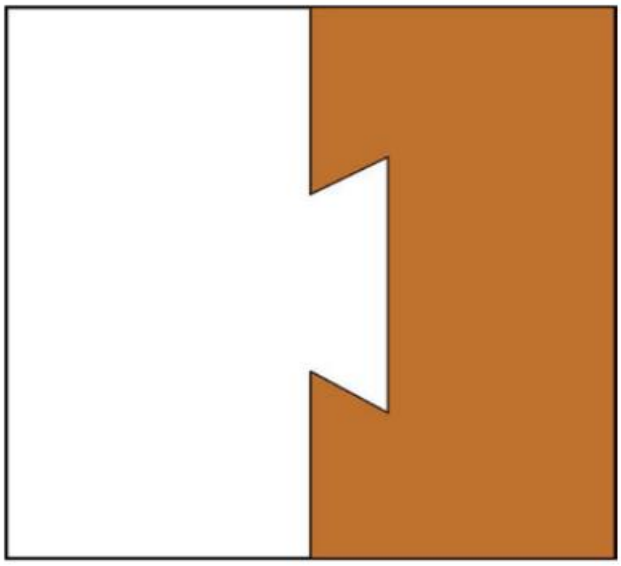
Fig. 3.63 Green Edge House, Fujieda, Japan, 2013. Designed by mA-style Architects. *Photograph* by Makoto Yasuda

may also be at fault here in that it answers the brief, but the client is not the professional, who is charged with interpreting the needs and wants into a receptive human environment. The purist will defend this type of solution, but I cannot see any sign of embellishment which beckons or is inviting.

This house in Fig. 3.63 is one of the most extreme examples of non-architecture that I have ever seen, in that it has no beginning or end; contextually it is ignoring its neighbours. It is apparently floating and gives the impression that it is ready for some advertising hoarding. It is also vulnerable to graffiti. This solution is very one dimensional, negative, and unwelcoming. It says more about the architect's ego than anything else. I would say that in this example, design has been disintegrated into almost nothing; a blank canvas waiting for something to happen.

Chapter 4
Construction Concept

Abstract Construction and concept are not natural bedfellows so I explain basic construction principles and relationships of components. It is about how things come together. I propose a new word 'Interadapt' which is about what interior design does to a building. I describe two basic fixing relationships: fixing to structure and object to object. This involves structure to support systems, from doors to furniture, and shelving and stairs. I ask the question of what is expressed simply to emphasise how important a contribution construction makes towards defining the character and concept of the final interior. I provide examples including the tricky element of glass, which deals with the notion of transparency.



Much of building design utilises the knowledge of established materials and components (such as brick, timber, joists, doors, etc.*), which are fitted together by established techniques……Designers need to be sufficiently versatile to*

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A. Sully, *Interior Design: Conceptual Basis*, DOI 10.1007/978-3-319-16474-8_4

adapt and elaborate on these established principles, in order to fulfil the design requirements peculiar to a particular building/interior scheme.[1] **Roland Ashcroft**

4.1 Context—Keyword: Making

This chapter is not about construction in detail but the conceptual thinking behind the construction. In many students' minds, construction detailing or working drawings are something that are done towards the end of a project, but this is a misguided notion. Before final drawings are executed to show and specify precise connections and assembly, the principle of how materials come together conceptually must be worked out first. The process of designing is a two-way process in that whilst the first thoughts may be about the form and aesthetics, the means of making (construction) can inform back to the design to help with decision-making. In order for a concept to be developed, the designer must be fully acquainted with all forms of building construction. Conventionally, it is this knowledge that can be a hindrance to conceptual thinking. I will explain.

The normal accepted full internal division of different spaces within a building is usually achieved by drawing 100–150 mm thick 'walls'. Immediately, going through the designers mind will be the following two limiting thoughts:

- The wall will be drawn on plan as being a vertical flat surface.
- Construction will be either a softwood/metal stud partition or brick and plaster.

It is as though any support system is a separate issue to spatial divisions, and they are usually added as loose items or fixed to these walls or enclosure as being 'built-in'. To properly consider the 3D quality of form and space as a response to the brief, there should be no such artificial demarcation of structure as has been commonly used for decades.

Figure 4.1 shows a 3D drawing of a hypothetical double-height partition that is cranked on plan with a work surface crossing diagonally from one space to the other. Convention would probably indicate first thoughts of a straight partition with a table either side. This example is not a habit-forming solution, but rather an indication of breaking free from traditional constraints and exploring more notions of vertical division and horizontal surface.

[1]Roland Ashcroft, *Constriction for Interior Designers,* (Harlow, Longman Group Ltd., 1985) p. 1.

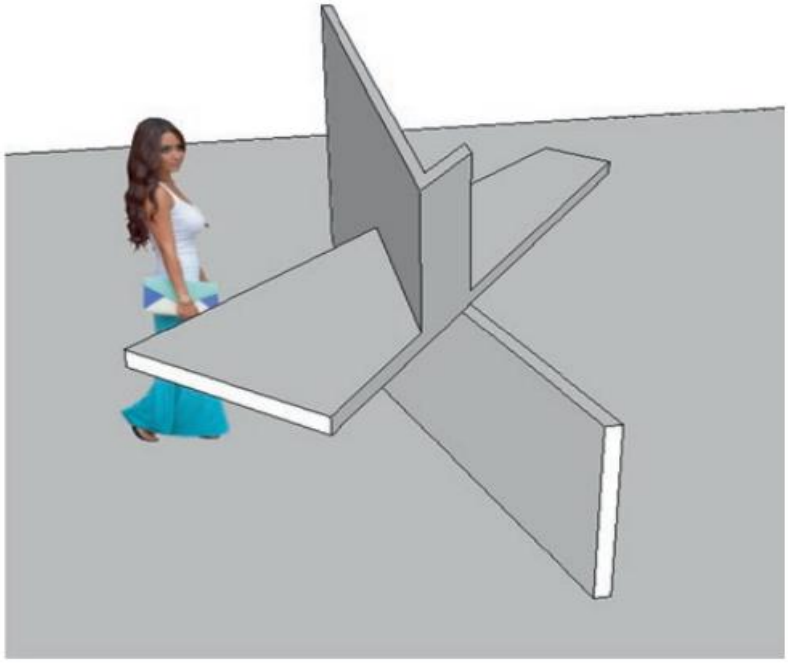


Fig. 4.1 3D wall plus work surface. Drawn by author

4.2 How Things Come Together

The architecture of an existing building, which will have new interiors to be designed, will have a method of construction and style that either the designer chooses to continue with in the development of new designs or reject and insert something entirely different. This relationship of building shell with the interior is explored in more detail in my last book on page 31. Whatever the direction is, I think that the method of constructing the interior presents very different problems as compared to the construction of a building under the control of an architect. It can involve designing everything down to the smallest item such as ironmongery and cutlery as exemplified in the work of C.R Mackintosh[2] and Arne Jacobsen.[3] The palette of materials for the designer to choose from is endless and is dependent upon not only on appropriateness for the job, but also fitting in with the availability, delivery and cost. Other factors such as sustainability, safety and satisfying building regulations are also important. It is interesting to ponder upon

[2]Charles Rennie Mackintosh (1868–1928) was a Scottish architect, designer, water colourist and artist. He was a designer in the post-impressionist movement and also the main representative of Art Nouveau in the UK.

[3]Arne Emil Jacobsen, Hon. FAIA (1902–1971) was a Danish architect and designer. He is remembered for his contribution to architectural functionalism as well as for the worldwide success he enjoyed with simple but effective chair designs.

the various 'makers' of interiors and an indicative list of the materials that belong within their general sphere of production:

Builders—dealing with primary and secondary structures using brick, concrete, plaster, timber or steel;
Engineers—employed if needed for structural alterations and building services.
Shopfitters—support systems of internal assembly of joinery, partitions, doors, ceilings, flooring and general finishes.
Contract Furnishers and Decorators—surface finishes, soft furnishing, hard furnishing, kitchens and bathrooms, lighting.
Craftspeople—special commissions of objects in a variety of materials.
Plus of course the rising importance of computers and IT and communications.

The sequence could be:

WHAT	HOW	WHO
CONSTRUCTION CONCEPT	MATERIALS FIXINGS ASSEMBLY INSTALLATION	CHOICE ALSO GOVERNED BY WHO BUILDS

The 'What' is formulated from a combination of material first and 'coming together' second. The material is expressed through its own texture, but the fixing/joining method will be chosen either to be expressed visually or because of its ease of concealment. The two main situations that a designer has to consider and detail by drawing when putting things together are as follows:

1. Face to face—i.e. unit type (brick, block) and panel/frame type
2. Junction of corner—where two or more planes or members meet

These situations could consist of many layers of materials. Throughout history, the interiors of buildings have been perceived as being the 'dressing' or the 'scenery' filling up the inside of a stone, timber, concrete or steel structure. This perception continues to this day but runs parallel with the integrated building design approach of a strong visual identity linking both the exterior and interior in terms of construction and materials. This is helped with the transparency of glass architecture. The 'scenery' approach will either relate to and express the structure and style of the building (Nuda Veritas)[4] or it will provide an independently styled design that becomes a modern intervention into the building (Masque). This is indicated in the drawing (Fig. 4.2).

The means of applying this internal skin or scenery and contents to a building does not really have a word in the English language to describe it.

[4]Anthony Sully, *Interior Design: Theory and Process,* (London, A and C Black, 2012), p. 172.

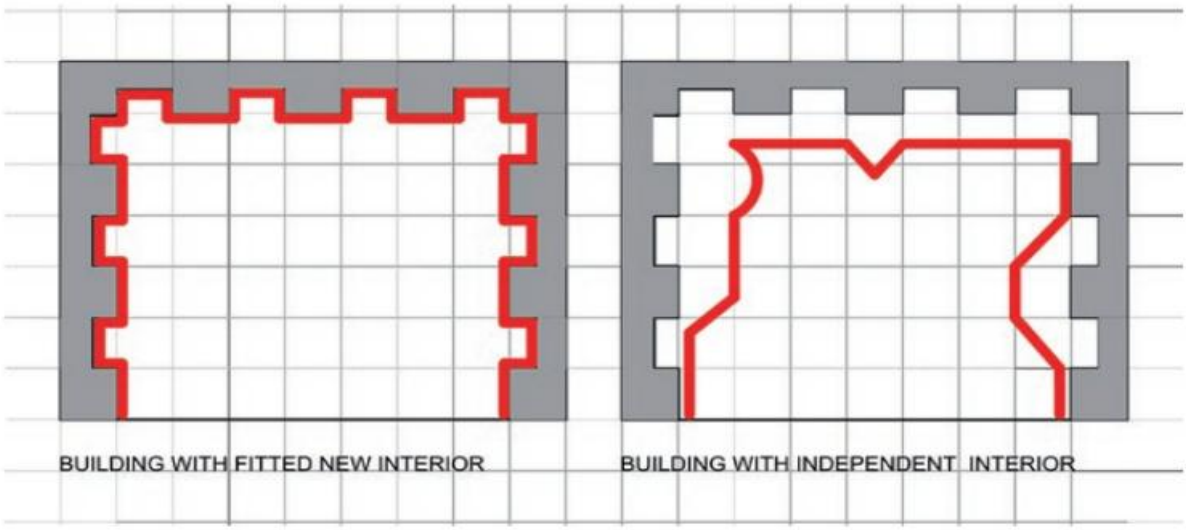


Fig. 4.2 Building/interior enclosure relationship (Nuda Veritas *left*, Masque *right*)

4.3 Interadapt—New Word!

This is my proposed word for describing the physical work done to a building as a result of an interior design project being implemented. It is derived from two words: 'Interior', which covers the subject matter in hand, and 'Adapt', which sums up what we are doing to a building through the design process. We are adapting it to suit the new use or new client. Just in the same way that humankind has adapted the planet to suit our needs.

The reason for this proposal is that there is a gap in the English vocabulary to summarily describe the essence of what interior design does to a building. Architects design buildings, which are built. 'Built' being a derivative from the word 'building'. You could say interior designers design interiors that are built, but it is just repeating what architects do and does not define what interior designers totally do to a building. There are other words such as convert, or 'fit-out', which usually refers to an office interior. 'Space planning' again belongs to the office design arena. 'Refurbish' is about improving the existing interiors. 'Restore' and 'Renovate' are about restoring the building back to its original state and style (Restoration). 'Remodel' is borrowed from modelling and is not really appropriate. 'Rehabilitate' is the same as restore. 'Assemble' strictly refers to a range of products that fit to each other to create a partition, or staircase, or other joinery work. 'Decorate' refers to only the finishing stages of an interior project. 'Furnishing' only refers to the furniture and décor. 'Environmental design' is a loose woolly term and mainly covers environmental engineering. 'Installation' covers particular goods rather than those activities carried by trades and craftspeople. So we can say furniture and partitions are installed, plaster and paint are applied, walls are clad with panels, carpet is fitted and tiles are laid. In the UK, we describe the stages of fitting out in terms of '1st Fix' which covers all preparatory

work such as concrete, plaster, carpentry framework and preliminary building services work and 2nd Fix which is all the finishing work. At the present time, the following applies.

The designers will say:
I have just completed a conversion.
I have just completed a refurbishment.
I have interior-designed this property.
I have designed the interior.

The 'makers' can say:
I have built this interior.
I have installed this interior.
I have fitted out this interior.
I have decorated this interior (only part of the work).
I have furnished this interior.

Now if you use my proposed term, it includes all of the above:
I have just interadapted this building. Meaning that you have designed and supervised the building and installation of an interior. The building has been interadapted.

More terms:
The interiors have undergone an interadaption—*noun.*
The next stage is to interadapt this space—*verb.*
We are interadapting this building—*present participle.*

Let us examine the stages or different methods of building an interior (or interadapt) to the structure of a given building shell:

1. Adding to the structure in terms of the enclosure (walls, floors, ceilings) refer Sect. 4.2.
2. Application of liquid coatings such as plaster and paint, and linings direct not only onto structure but also onto cladding panels.
3. Application of flexible membranes such as wallpaper, PVC and leather.
4. Cladding of rigid materials such as panels, ceramic tiles, marble and ceiling systems.
5. Fixing of a framework to which panels may be fixed (Figs. 4.3 and 4.4).

The enclosure is described in simple terms as being comprised of walls, floor and ceiling. The relationship of any independent fixtures to these elements can be described in terms of being:

WALLS—fixed direct or cantilevered	)
FLOOR—free standing/fixing	)
CEILING—suspended	) INTERADAPT
BETWEEN FLOOR AND CEILING—wedged	)
FROM WALL TO WALL—spanning	)

See Fig. 4.5.

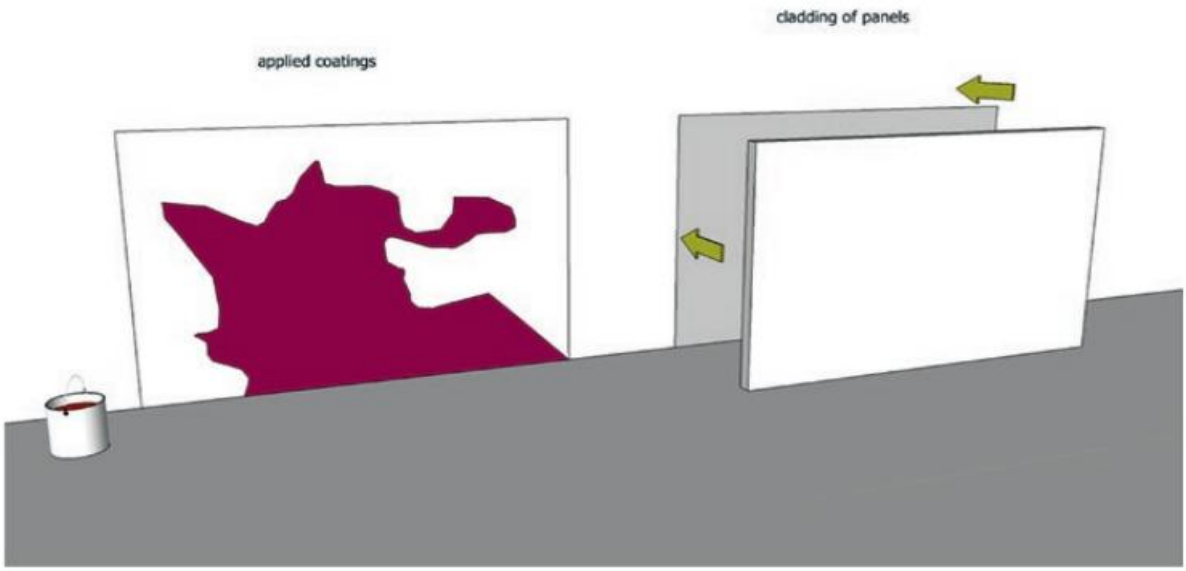


Fig. 4.3 Coatings and cladding

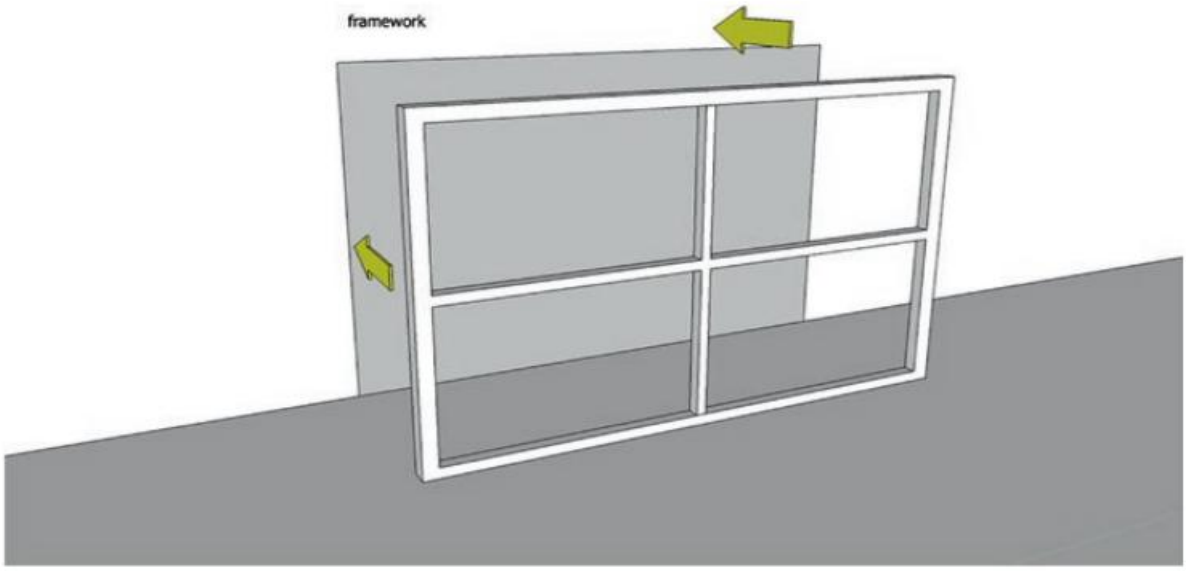


Fig. 4.4 Framework

The consideration of surface finishes for a construction concept is dealt with only in so far as what kind of material is being considered and not the final specified product. Otherwise, this strays into the 'Material' concept.

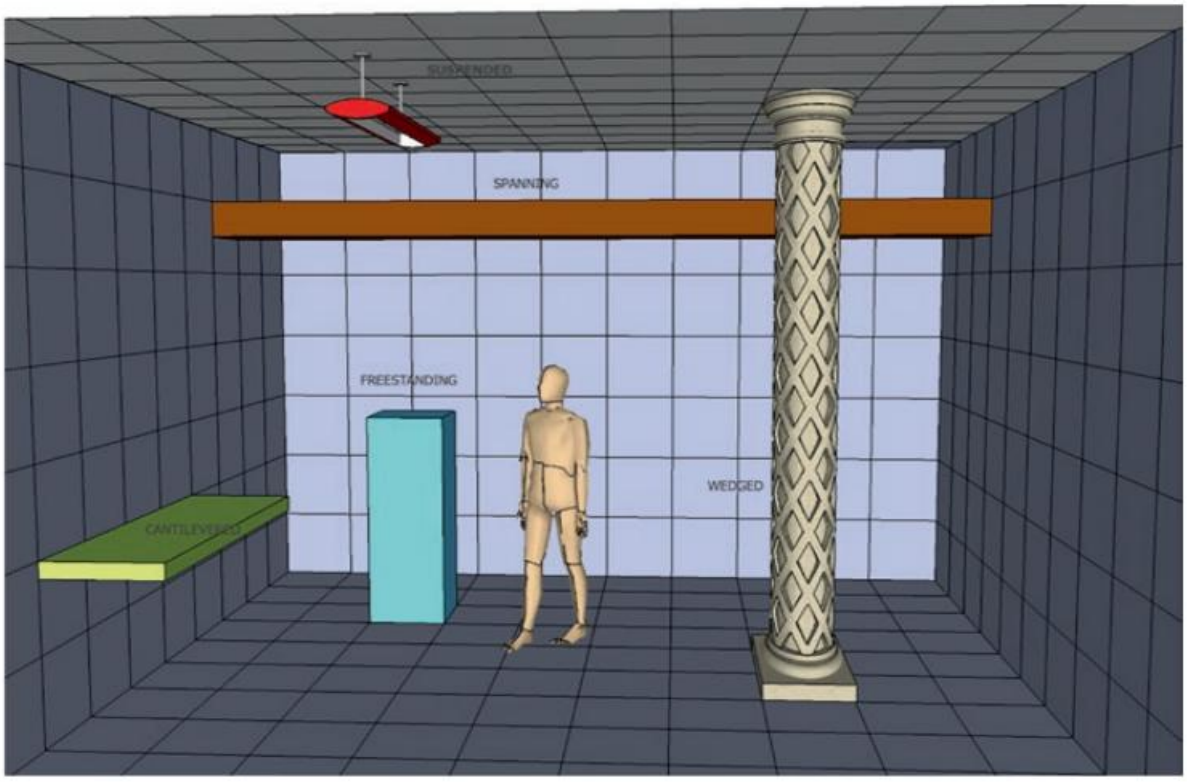


Fig. 4.5 Interadaptive actionable elements

4.4 Construction Choices

There may be instances when some component parts of the interior will require moving, repositioning or adjusting according to client's requirements. So when fixings are considered, they will either be made to be permanent or capable of being unfixed for adjustment.

4.4.1 Fixing to Structure

The primary structure may be concrete, brick, block, steel or timber (plus coatings or cladding as specified), and each material demands special fixing devices which are many and complex. New work may also use same as existing structural materials. The following illustrates a few of these.

4.4.2 Fixings

The facing object can sometimes be fixed direct to the ground dependent upon materials used. But usually, there is a supporting intermediary between the ground and facing object as Fig. 4.6 illustrates. If the fastening of the facing

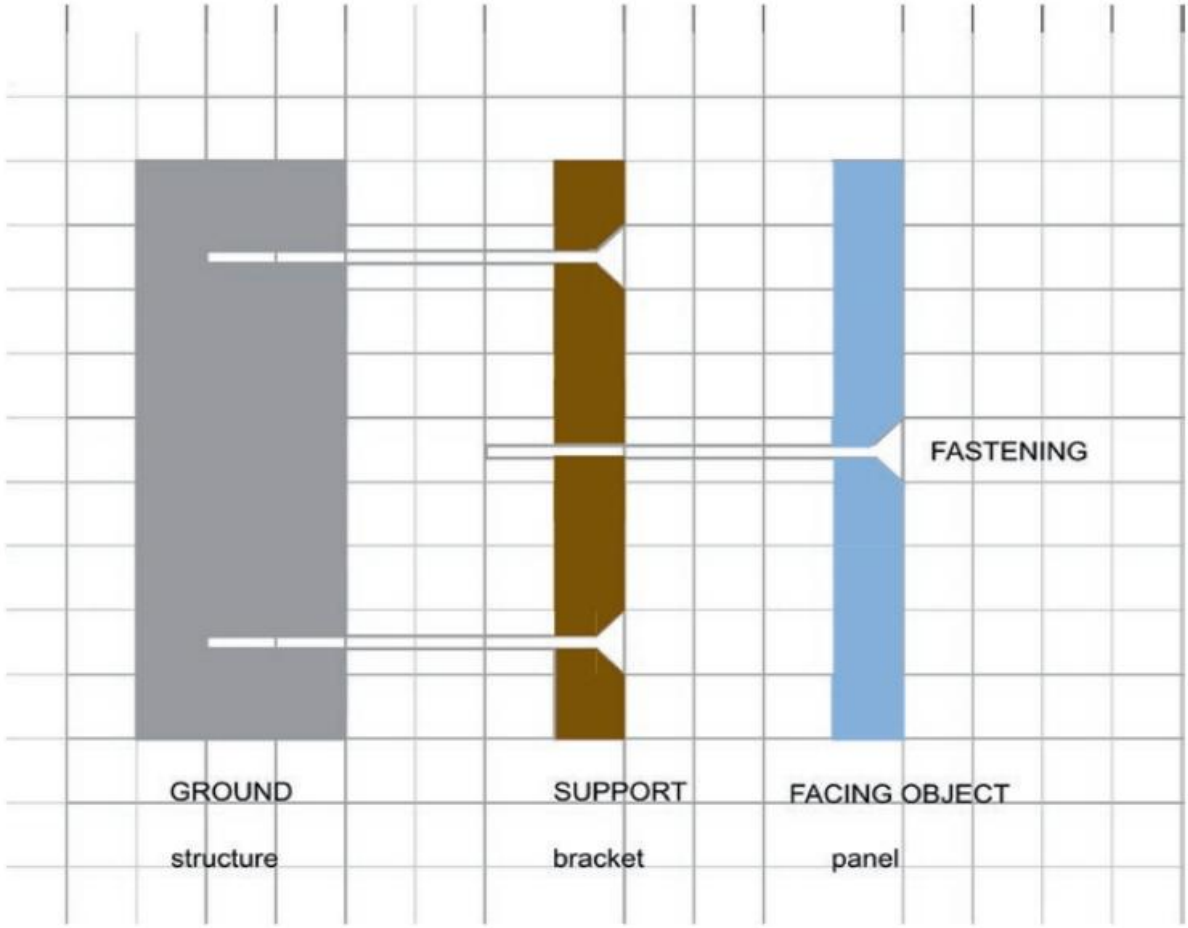


Fig. 4.6 Diagram showing principle of fixing

object was not to be seen, then it can be concealed through a secret fixing device. Alternatively, there are several methods of expressing the screw fixing as a countersunk head in a sunken cup washer or a domed screw head as used to fix mirrors.

Examples of fastenings:

Expansion wall plug

Spring toggle

Cavity wall fixing bolt

The first two items above are inserted into a pre-drilled hole in plaster or brickwork ready to receive a screw. When the screw is inserted, the main body

of the plug expands and hence grips the wall of the hole providing a firm fixing. The screw is of course already through an object such as a timber batten, metal bracket and so on, which is the main purpose of this fixing. The cavity wall fixing is used to fix an item to a panel such as plasterboard. The plasterboard is already fixed to a wall on battens which leaves a cavity between it and the structural wall. The cavity fixing bolt shown with the wings closed up is pushed through the item (wall bracket, for example) and a pre-drilled hole in the plasterboard. Whereupon the wings fly open on a spring and when the bolt (with washer) is tightened, the washer and wings clamp the bracket to the plasterboard.

All fixings below are doing similar jobs but for tougher materials and structure. The eyes and hook are for attaching cables. The wire hanger is for use with suspended ceilings which hang on wires or metal straps (Fig. 4.7).

The drawing in Fig. 4.8 is showing a wall pre-drilled to accept two rawlplugs, and a batten pre-drilled to accept two screws which will pass through to bite on the plugs and when tightened will secure the batten to the wall. Battens are usually hidden from the interior because they are facilitating future product fixings and therefore are basic carpentry softwood.[5] When screws are screwed into the batten, washers or cups can be used to prevent the screw biting into the batten and reducing the depth of wood being gripped.

Fig. 4.7 Illustrations with kind permission from Forgefix UK

[5]For timber construction see: John Eastwick-Field and John Stillman, *The Design and Practice of Joinery,* (London, The Architectural Press, 1958).

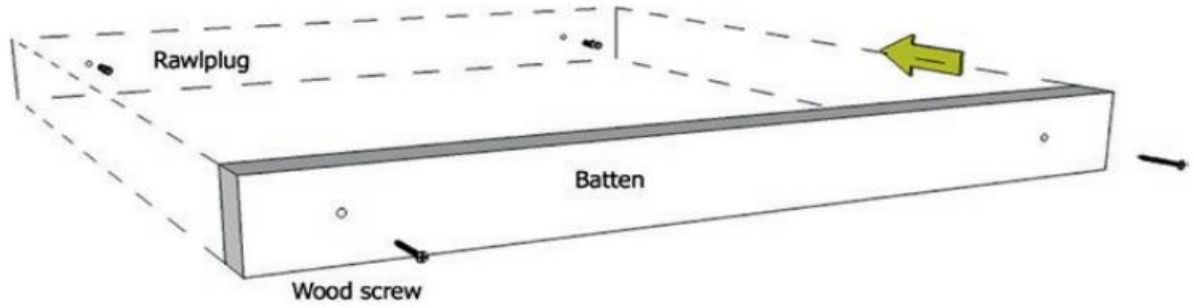


Fig. 4.8 Timber batten fixing to wall

4.4.3 Fixed Support System

This wall hung desk unit does not appear to have any visible means of support or fixing. The designers obviously wanted to provide a clean bond between desk and wall. The wall appears to be clad in a dark-stained wood panel, which in turn would be fixed either to framework or to the structure of the building. The construction concept here is to hide the joining of materials rather than express them. Note the discreet recessed spotlights (Fig. 4.9).

Fig. 4.9 Wall hung desk unit designed by Atelier van Wengerden. *Photograph* by Yvonne Brandwijk

4.4.4 Blockwork Partitions

The blockwork partitions in Fig. 4.10 are the same built around existing cast-iron columns in a square layout as Fig. 4.11 shows. The design proposed a semicircular niche which was achieved by fixing curved softwood formers on to the blockwork. The plasterboard was scored as Fig. 4.12 shows to enable it to be curved onto the formers. The applied skim of plaster followed a true curve. The skirting was steam bent oak to follow the same radius.

Fig. 4.10 Blockwork partitions before receiving plasterwork Glendower House Chapel conversion (Anthony Sully, designer of Glendower St Chapel conversion, Monmouth, Wales, 2002). *Photograph* by author

Fig. 4.11 Softwood formers prior to receiving plasterboard. Glendower House. *Photograph* by author

Fig. 4.12 Scored plasterboard to enable the curved plaster finish to be achieved. *Photograph* by author

4.5 Object-to-Object Fixing/Support Systems

Examples chosen are those I consider to be the most common in interior design and exclude the many decorative items that exist:

A. Door to partition—fixing required (access provision)
B. Worktop to supporting framework—fixing required (working surface)
C. A table—loose support system (multifunctional surface)
D. A chair—loose support system (seating)
E. Shelf to supporting framework—fixing required (display and storage)
F. Stair tread to supporting elements—fixing required (vertical circulation plus E)

The combination of shelving and framework can produce many items of furniture such as wardrobes and storage cupboards of all kinds. There are also many smaller independent objects such as light fittings and mirrors plus a plethora of other objects which are not included in this conceptual focus of the broad subjects listed above.

I expand on more support systems in Chap. 5 when I focus on the materials used. Of course, many design solutions could merge any of the above and overlaps can occur.

4.5.1 Door to Partition

One of the greatest departures from the conventional door in recent times must be the evolution door designed by the Austrian artist Klemens Torggler (Figs. 4.13, 4.14, 4.15, 4.16, 4.17 and 4.18). The evolution door (made 2013, sized 1300 mm × 2600 mm × 36 mm) is made out of wood, MDF, lacquer, cellular rubber and steel (hinges and mechanics). There are a few variations on this door, one with the origami-esque triangles that fold out to help the door move and another system with rods that rotate two square panels. The beauty of this idea is that it has re-examined the function of doorway access. The mechanisms that we are used to in the past are either a hinged single panel or a hinged folding panel, or a sliding panel. This product comes under the category of 'Mechanics of Operation' (MOO) as discussed in my last book on page 138. Let us examine the stages Torggler might have gone through:

1. He divided the opening into two separate square panels, which are just larger than the opening, as shown in Fig. 4.13. All photographs were taken by Akos Vincze.
2. He then decided against the common practice of sliding the door horizontally in this position but conceived of two fixed pivot points, one at the head and one at the base, to rotate the two panels as shown in Fig. 4.14.
3. But in order for the square panels to effect a rotation, they each had to fold along the diagonal but also pivoting on one corner only, the other corner being unattached, as shown in Figs. 4.15 and 4.16. They fold outwards away from the wall, which means the door takes up part of the room territory as shown in Fig. 4.17.
4. This enabled the final action of closure to be achieved as shown in Fig. 4.18.

Fig. 4.13 Evolution door 1

Fig. 4.14 Evolution door 2

Fig. 4.15 Evolution door 3

Fig. 4.16 Evolution door 4

Fig. 4.17 Evolution door 5

Fig. 4.18 Evolution door 6

4.5.2 Worktop to Supporting Framework

A worktop can be described as being part of an independent piece of furniture such as a desk, or a fixed, built-in surface such as exists in kitchens, workshops or laboratories. Offices can sometimes use free-standing tables of various sizes to suit, for a multitude of uses depending upon their location. The worktops in Figs. 4.19, 4.20 and 4.21 follow on with my MOO category with ingenious dual use of the space as a seated work area or a cleared floor area.

Fig. 4.19 Worktops down for use. Arts Council Regional Office, West Midlands, England, 2012. Architects Moxon. *Photograph* by Simon Kennedy

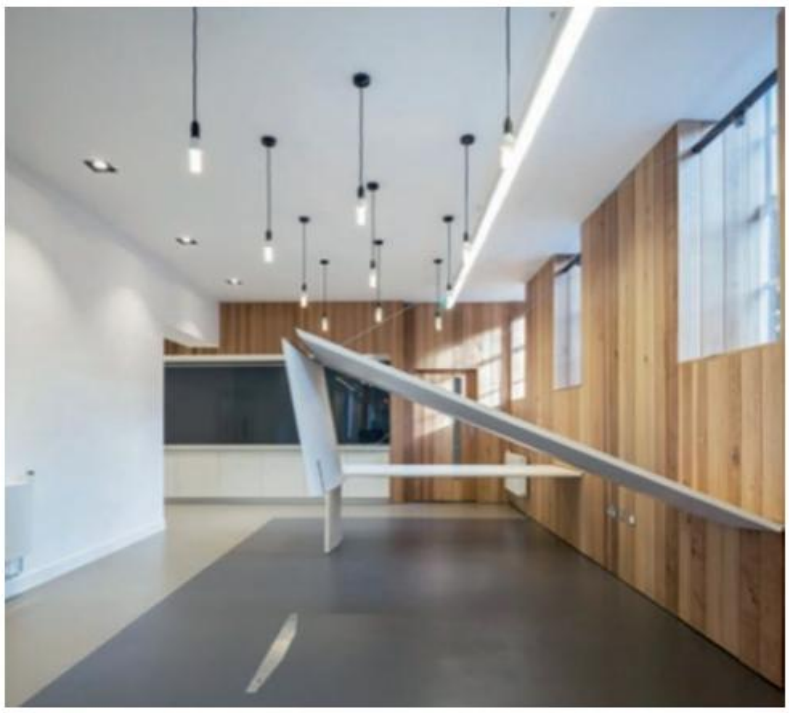


Fig. 4.20 Worktops begin to be raised off the floor

Fig. 4.21 Table up in vertical position

Fig. 4.22 Didomestic apartment showing drop-down support system from ceiling. *Photograph* by Miguel de Guzmán. www.imagensubliminal.com

The table has a locating device to hold it in the floor, and it is hinged to the wall as shown in Fig. 4.19. The supporting plane has a mitred hinged joint meeting the worktop. A cable winches the table up to the vertical position as seen in Figs. 4.20 and 4.21.

Another example in Figs. 4.22 and 4.23 is of a MOO design for a Didomestic apartment in Madrid designed by Elii Architects: Uriel Fogué, Eva Gil, Carlos Palacios. This is their project description:

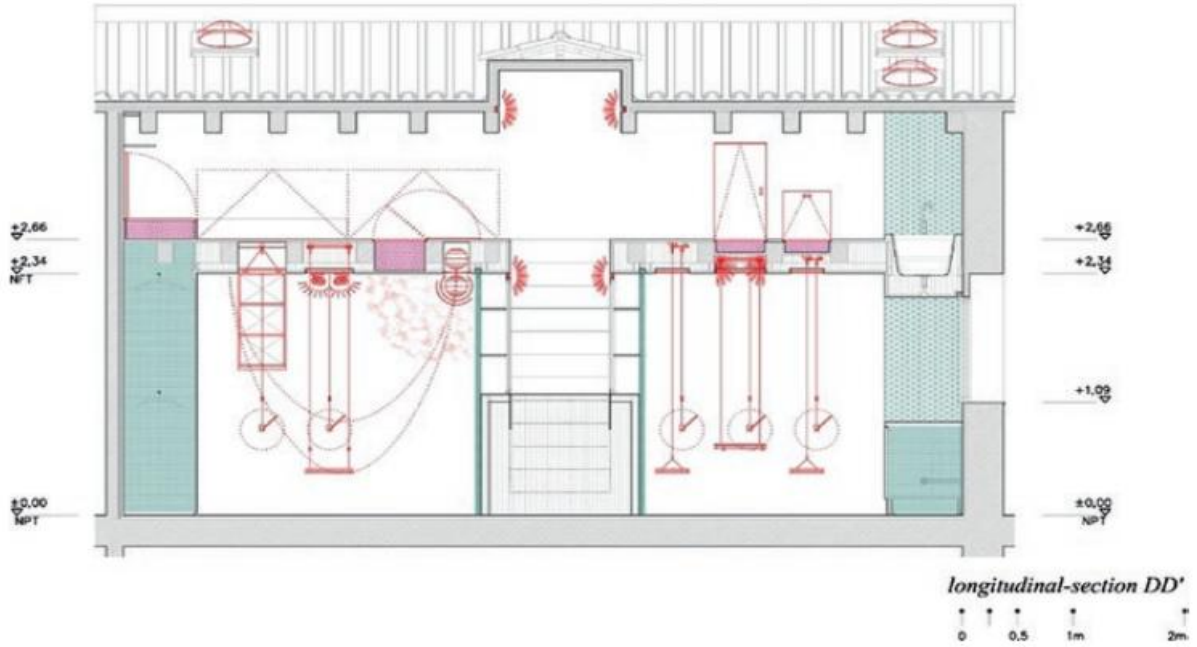


Fig. 4.23 Section through didomestic apartment

The challenge was to create a design that makes optimal use of the reduced space by creating flexible rooms that can be adapted for different activities throughout the day.

Four sliding panels allow the ground floor to be either opened up or divided into a series of smaller spaces, allowing the space to adapt to fulfil various needs, such as adding an extra room for a guest, separating the kitchen from the living room area or opening the whole floor for a party. The moving panels, which are integrated into the central core and run along guide rails, have transparent sections so the natural lighting coming through the mansard roof can reach the entire space.

Other features reveal wardrobes built into one of the walls and a picnic table and bench that lower down from the kitchen ceiling. A rotating handle on the wall controls the pulleys needed to lower this furniture from the ceiling, while other handles can be used to create an auxiliary kitchen table and shelves.

All these elements are integrated within the floor and the ceiling, and they appear and disappear at the user's whim. The secret trap doors and the sliding panels complement the basic configuration, fit the needs of the moment and provide different home layout combinations.

My last example of a MOO design as shown in Figs. 4.24 and 4.25 is one which signals great changes in the workplace culture as mentioned in my Introduction. The following is a statement by the designers:

We wanted to create a space that allowed us to take on multiple characters, a space that will allow us to flex—to be big and small, to rove from solo, to team, to crowd. We wanted to create a space which could be broken down without losing the sense of generosity and openness. We wanted to create a space with embedded opportunity, an infrastructure for work, creating and making.

Fig. 4.24 Architectural studio, Melbourne by Particular Architects, 2014

Fig. 4.25 Adjusting the furniture, architectural studio, Melbourne by Particular Architects, 2014

Inspired by the micro living units in Hong Kong, the space is populated with a series of track mounted plywood bookcases which serve as storage, display units and also as dividers. When filled, they form an eclectic and vibrant backdrop to the activity they enclose. Custom desk panels have been design to nestle into rebates in the shelves, creating capacity for increased desk capacity during peak project load periods.

4.5.3 A Table

+*table* (Figs. 4.26 and 4.27) was developed from *Fraaiheid's* working experience in Dutch construction and their desire to make innovative products which easily appeal to a public and that can be put together in 3 min. All the pieces are made

Fig. 4.26 +*table* is designed by Fraaiheid Dutch architects: Daniel Aw, Sjoerd Schaapveld and Rikjan Scholten, 2013

Fig. 4.27 +*table* is designed by *Fraaiheid* Dutch architects: Daniel Aw, Sjoerd Schaapveld and Rikjan Scholten, 2013

out of one sheet of plywood finished in laminate as Fig. 4.28 shows. All of the table parts slot into each other without the aid of any tools or fixing devices. The cross-shaped joint provides the designers with the name *+table*. Compared with many modern designs that lack integrity of form and poor reasoning, this design expresses how it is made (Fig. 4.29).

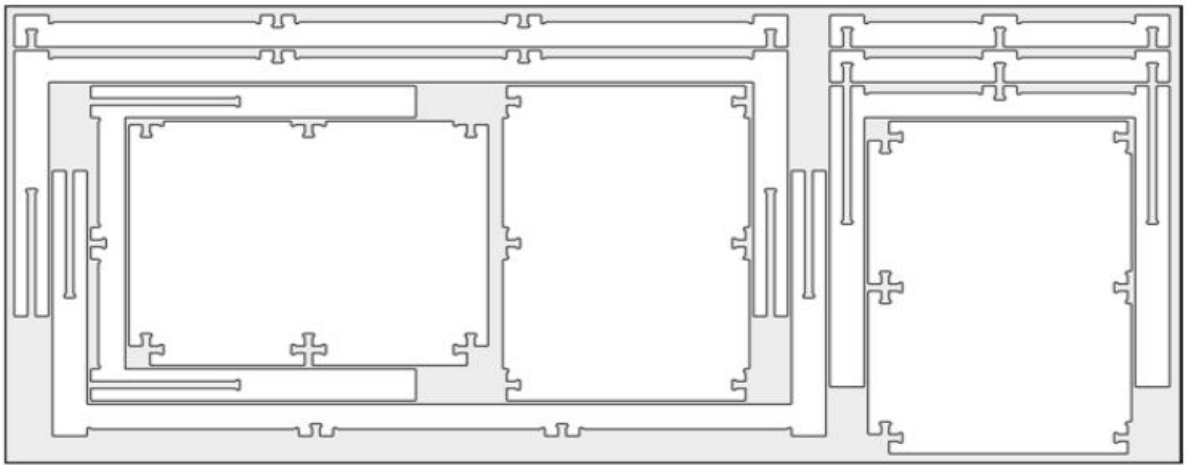


Fig. 4.28 This shows how each component is machined out of one board

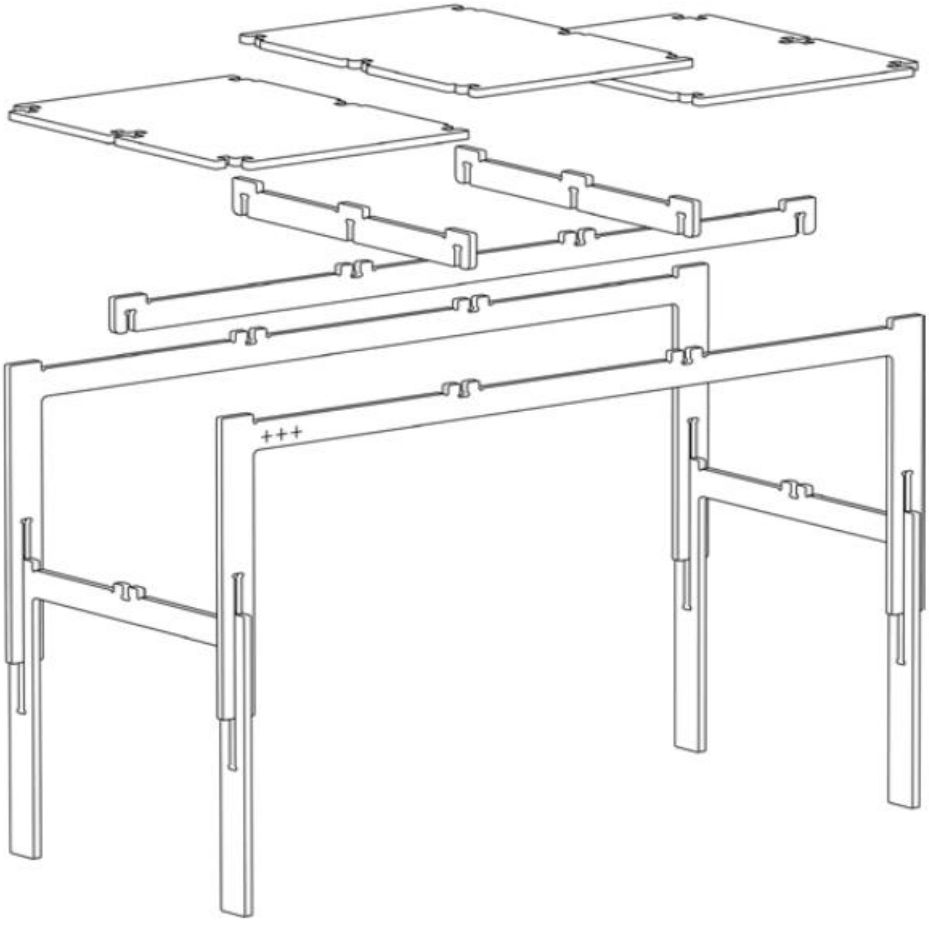


Fig. 4.29 Exploded view showing intended assembly of the component

4.5.4 A Chair

Uncino chair in Figs. 4.30 and 4.31. Designer's statement:

'*Uncino is an almost primitive wooden chair collection. The chairs are composed by two or three pieces of numerically sculpted wood, which are held in place by simple metal rods. The metal rods set the carved wooden pieces in an almost organic overlapping.*

We conceived a family of wooden task chairs with two different backrest a (four star) swivel base and a (three legged) sledge base. The gently carved wooden pieces are held in place by bent metal rods—while wood remains the main actor, the metal parts play a fundamental role in the construction. The metal structure joins the pieces of wood in an almost organic overlap. The wood embraces the metal rods whose form subtlety appears on the wooden surface like a prominence'.

Both the above Table and Chair demonstrate the beauty and conceptual thinking behind these designs. Whilst they are both free-standing and moveable support systems, they have qualities and properties that may serve a particular interior. These are items that would be considered 'off the shelf' because they are not designed for a specific interior. This is the case with most furniture manufacturers who aim to sell to the global mass market. I believe that interior designers need to learn more about the skills of furniture and product design in order to maximise on

Fig. 4.30 Uncino chair designed by Ronan and Erwan of Paris, 2014. *Photograph* by © Gerhardt Kellerman

Fig. 4.31 Uncino chair designed by Ronan and Erwan of Paris, 2014. *Photograph* by © Gerhardt Kellerman

the connectivity of materials. The fabrication and installation of the bulk of interior components come from factories rather than craft workshops. The remainder of work executed on site will come under 'forming/making' techniques that can only be done in situ, such as concrete, brickwork, plaster, carpentry framing and of course applied decoration.

Another chair example that fits my MOO category (Fig. 4.32a–f) is the beautiful Exocet folding piece that supports the human figure in many ways, designed by Canadian Stephane Leathead of Designarium. Reminiscent of an egg slicer with dovetailed wooden members pivoting from a central hub. The genius behind its success is due to the gentle curved sweep that is in scale and receives the human form. The way these 'arms' rest on the floor reminds me of Mies van der Rohe's Barcelona chair.[6] The materials are Baltic Birch and aluminium.

[6]Anthony Sully, *Interior Design: Theory and Process*, (London, A&C Black, 2012) p. 102.

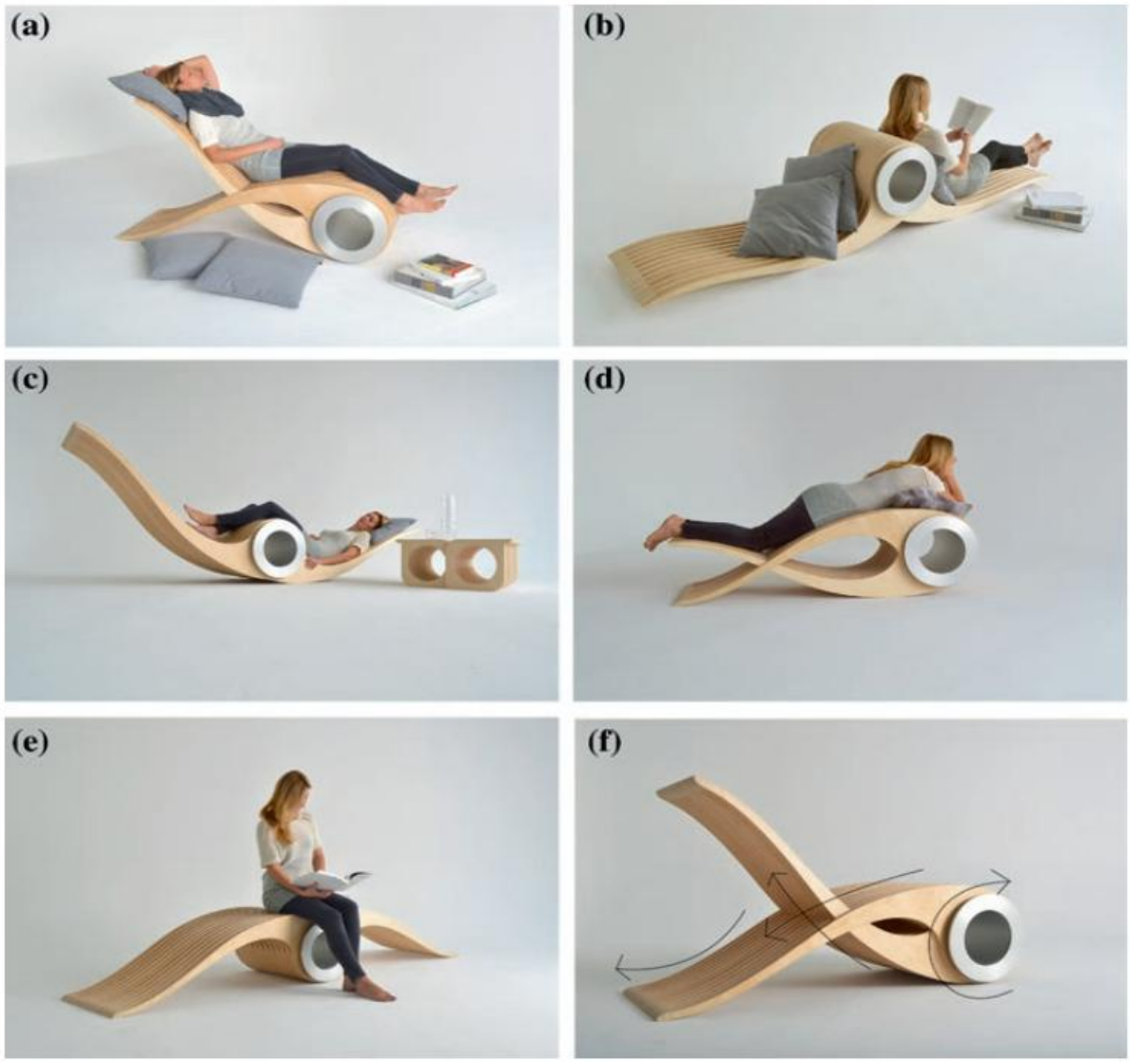


Fig. 4.32 Exocet designed by Stephane Leathead of Designarium 2015. **a** Recline position. **b** Floor recline. **c** Rocking. **d** Face down recline. **e** Normal sitting position. **f** Movement analysis

4.5.5 Shelf to Supporting Framework

There are many conditions and types of form and structure that shelving is used for, either storage or display. One factor that can be applied as suits the location is that shelving can be fixed in position or be adjustable in height position. Shelf products that allow adjustability of length or of depth have not appeared on the market to my knowledge, but the fact that I have the idea of that being offered poses an interesting situation. This idea arrives because of considering flexibility and adjustment, and not in answer to a need. And this is an important point in the whole design process: usually, a design problem is defined as arising from an analysis of the needs and activities of the client. How are these needs collated? This is what other writers have said:

The primary function of collecting information and using it to develop a design is to understand the client's vision for the project. Ultimately, you are hired as an interior designer to respond to the client's vision, goals, dreams, needs, and budget issues. **Tiiu Poldma**[7]

While it is the prospective client who must tell the designer what work is contemplated, the designer very often has an active role in helping the client define what is called for.

…….user participation in design can contribute to developing projects that improve the user's quality of life. **John Pile**[8]

We can conclude that apart from a design solution being partially dependent upon an analysis of client needs and activities, it is also dependent upon the designer's own body of knowledge and research that stimulates any creative enquiry. So with regard to the topic of shelving, there are three distinct types that commonly exist:

- Homogenous and integrated
- Wall mounted
- Free standing

4.5.5.1 Homogeneous and Integrated

The shelving in the lounge in Fig. 4.33 is absorbed into the joinery structure of 'storage balustrades', so called because they form a barrier to a void to the ground floor. The exposed shelving supports a TV and sound system, as well as books and other objects that may serve a particular space. Built-in cupboards also conceal shelving.

4.5.5.2 Wall Mounted

See Fig. 4.34.

4.5.5.3 Free-Standing

Figure 4.35 shows a free-standing shelving unit whereby the shelving is not adjustable and the whole unit is moveable. Its ease of mobility being dependent upon the weight of goods on the shelves. As with all free-standing products, the

[7]Tiiu Poldma, *Taking up Space,* (New York, Fairchild Books, 2009) p. 69.

[8]John Pile, *Interior Design,* (New York, Prentice Hall, 1995) pp. 131, 189.

Fig. 4.33 First-floor lounge, Glendower House Chapel interadaption, Monmouth, Wales, 2002. Designed by Anthony sully

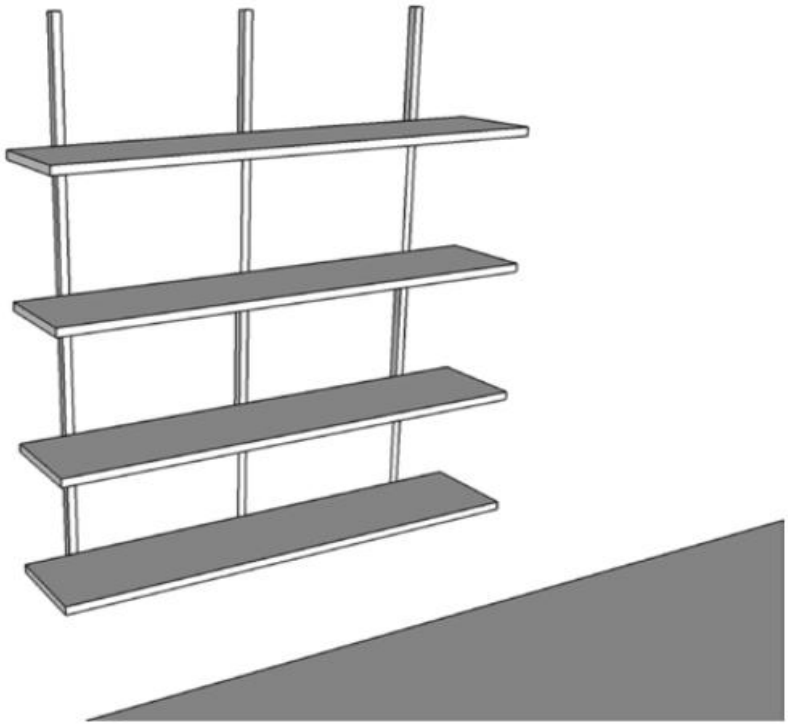


Fig. 4.34 These shelves would be supported on cantilevered brackets fixed to the uprights and they would be adjustable. The uprights are screwed to the wall

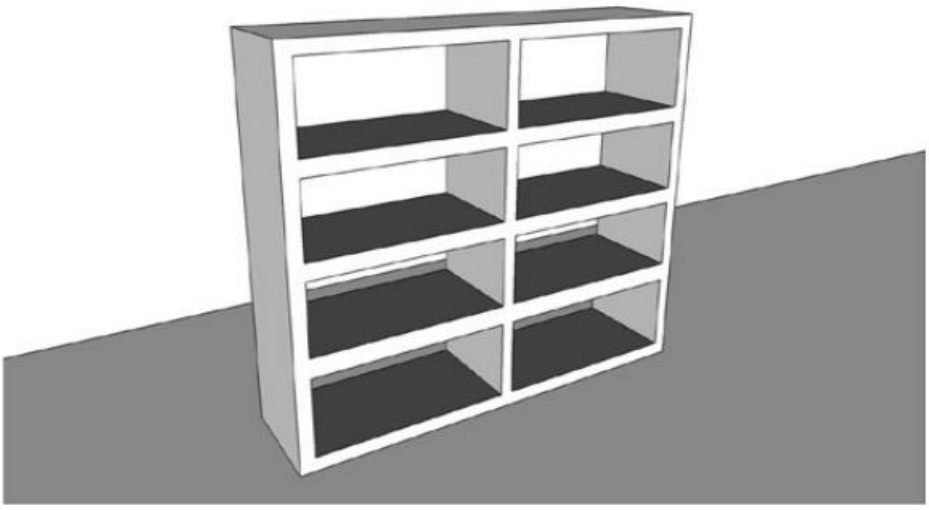


Fig. 4.35 Free-standing shelving unit

mobility can be eased by the addition of castors, glides or anything else that is considered to satisfy the brief.

4.5.6 Stair Tread to Supporting Framework

A straight staircase can have any combination of constructional elements such as treads, risers, side panels, balustrades, strings and understair-associated space use. Climbing is the operative verb to describe a person ascending from one level to another, as was done on mountains and hills in the natural landscape since primitive times. Climbing rock forms saw the beginning of footholds being carved out of the rock for each step in a staggered formation, or alternate steps (see illustration H in Fig. 4.36 as a modern equivalent).

Figure 4.36 shows each stair tread on a central string, which has become a popular concept for stair construction. G shows single full-width treads and H shows the alternate stair. It is fascinating to consider that the evolution of the full-width stair must have come from the alternate stair, but the progress of that change is difficult to determine. Version H appears to be minimal as well as functional, whereas version G, which we are all familiar with, appears to be extravagant by using more material. The reason for this is simply because when a person walks up the stair, the climb is similar to a walking action with one foot in front of the other. Hence, only half of the tread is being used. Now, it all depends upon which foot one leads when climbing a stair, as I am suggesting that each person has a preferred starting foot. Version H would not suit a person who starts with their right foot, but I guess everyone would adapt to such a restrictive choice. Another observation is that G is a safer stair than H which has larger gaps between treads for people to fall through.

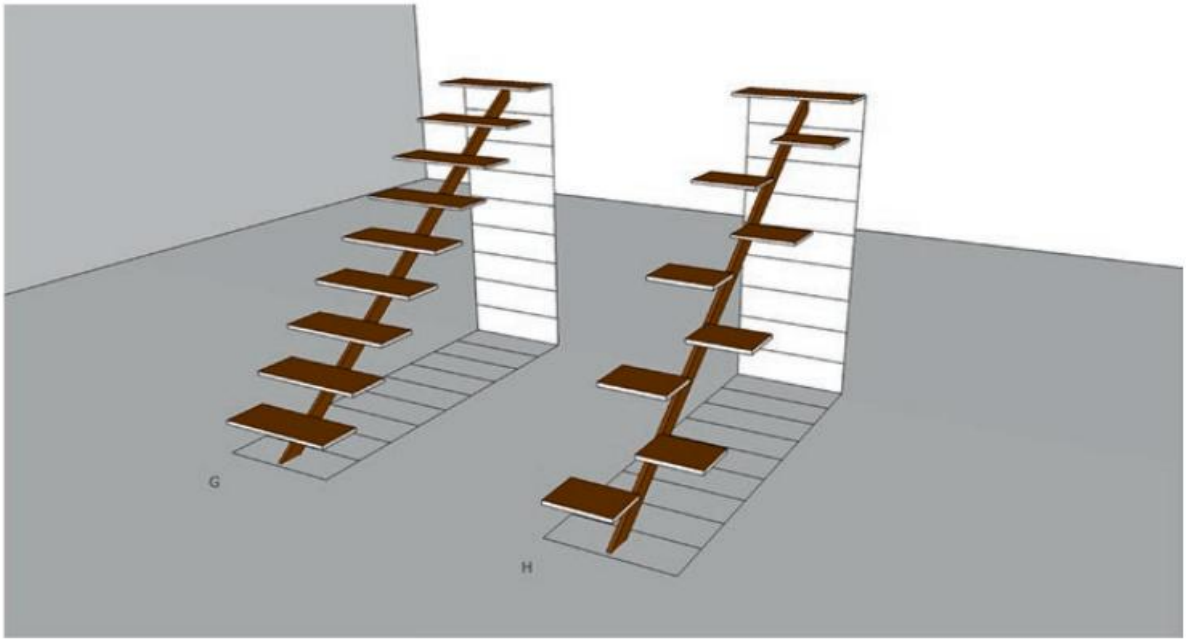


Fig. 4.36 Central string stair

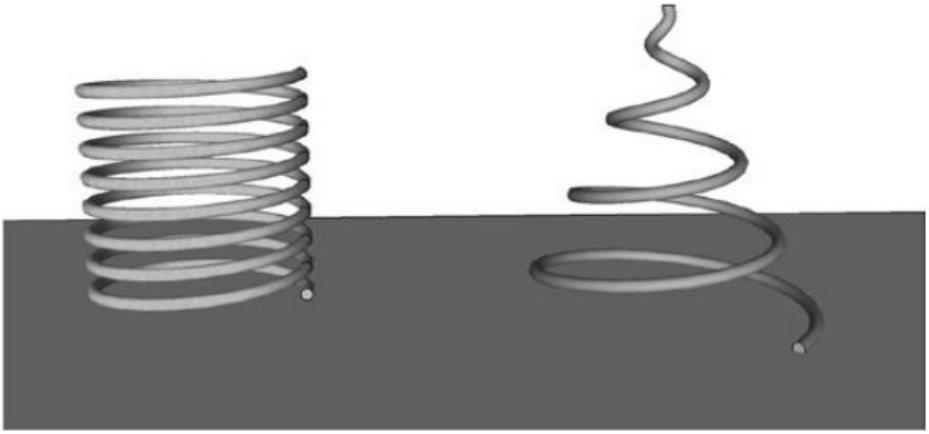


Fig. 4.37 Helix (L) and spiral (R) forms

The following illustrations are designed to show the basic elements surrounding the design of a straight staircase. There are many other types of staircase such as dogleg and helical stairs (spiral is the more common name, but this is of course geometrically incorrect as explained in the following diagram). One thing is for certain, whilst the riser may disappear and the tread will always exist.

The helical form, which is contained within a cylinder, is on the left, and the spiral form, which is contained within a cone, is on the right in Fig. 4.37. Figure 4.38 is an example of a helical stair made of satin finish stainless steel and oak treads and landing. Note that the balustrading is another variation of the ones illustrated in that they are parallel to the handrail.

Figure 4.39 shows some of the basic concepts of the straight stair.

Fig. 4.38 Helical stair made by Fine Iron, Brecon, Wales, UK, 2013

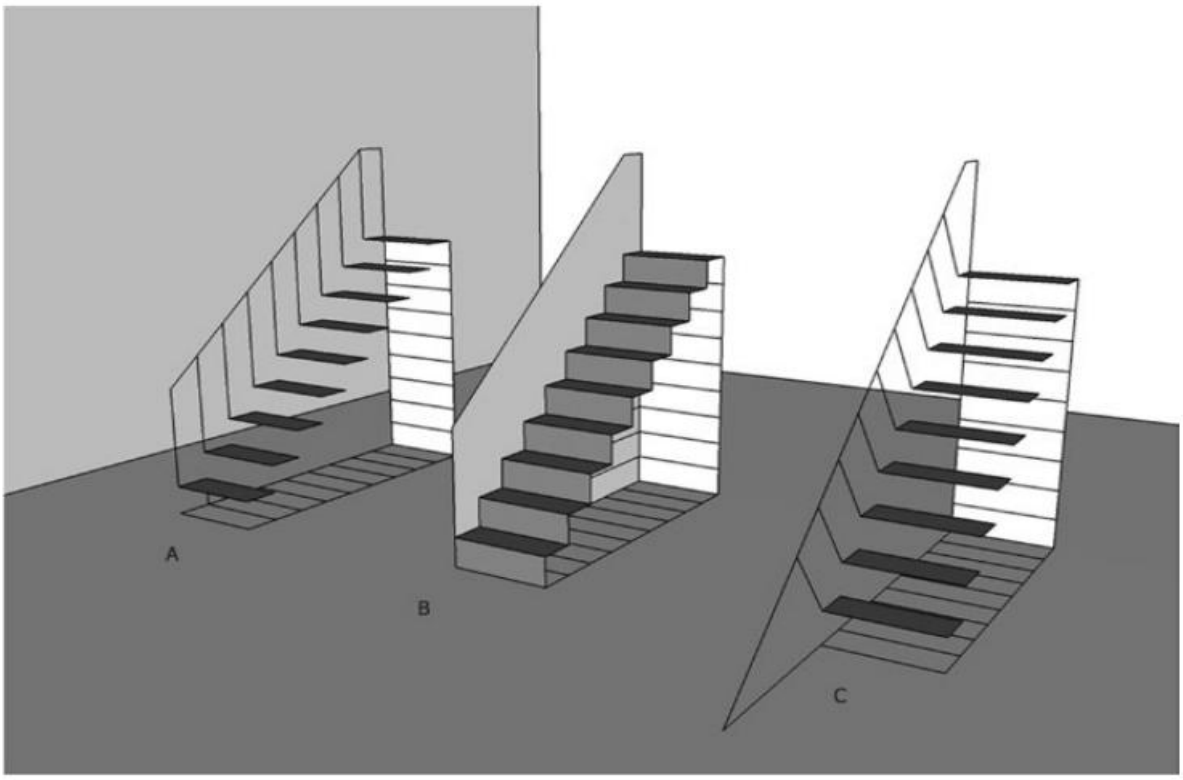


Fig. 4.39 Basic stair concepts

Fig. 4.40 Staircase made of continuous sheet steel in Window House in Kyoto, Japan, designed by Alphaville Architects, 2013

A. Shows floating treads (cantilevered) with vertical balustrades connecting to a handrail.
B. Shows treads and risers as a continuous structure—see Fig. 4.40. This stair in Japan has a winder as part of the design.
C. Shows floating treads but with balustrades at 90° to the handrail.

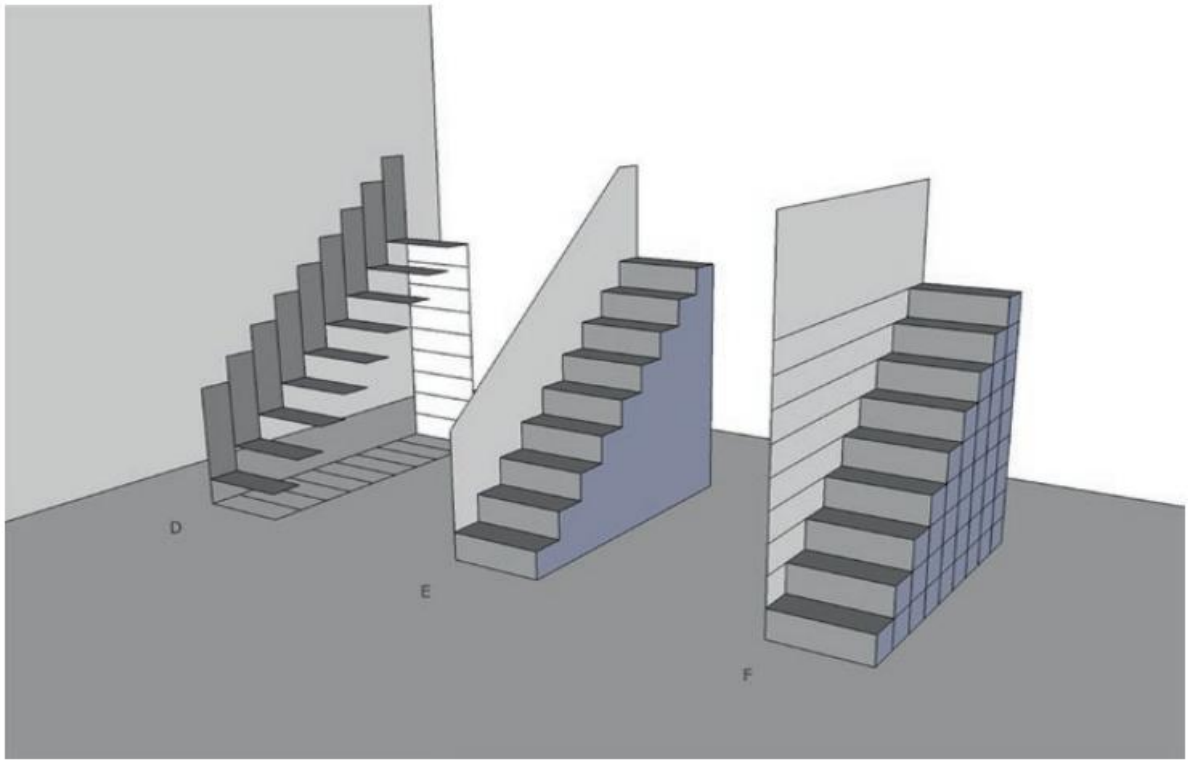


Fig. 4.41 More basic concepts of stairs

Figure 4.41 shows the following:

D. Floating treads with vertical panels expressing the width of tread and a stepped handrail.
E. As B previously but with solid fill under treads and risers.
F. As E but expressing the dimensions of the treads and risers horizontally and vertically.

There are countless variations of stair designs, but the above examples are designed to show how associated forms and their alliance with the tread and rise dimensions can help extend the function of the staircase volume into storage.

4.6 What is Expressed or Seen?

Generally, when the construction of a project is thought about or discussed, it usually begins by considering hidden framework, timber, concrete or brick as providing the bones of the structure, together with the provision of building services. Then, we have secondary structures that are often non-load-bearing, which means they can be made of lighter weight materials. And finally, the decoration and furnishing provide the finishing touches. The common perception is that structure is covered up and that the final decoration and surface finishes are exposed for all to see. But this is not necessarily the case as can be seen in Fig. 4.42 of a project in Japan.

Fig. 4.42 Archery Hall and Boxing Club, Tokyo, Japan, 2013. Designed by FT Architects/Katsuya Fukushima, Hiroko Tominag. *Photograph* by Shigeo Ogawa

The delicate lattice frames of the Boxing Club are composed of slender ties, beams and posts and are clearly expressed as being a strong visual property of the interior.

The decision of what is to be seen and expressed arrives very early on in the planning stages of the project. The designer will have a vision, or a series of visions, as to the kind of interior that will be interadapted. From Roman and Greek times, the common material for building was stone and marble because that was a natural resource in both Greece and Italy. Because the buildings of that time were homogeneous throughout, those materials were seen both externally and internally. Timber structures grew out of countries that wood was a natural resource. It was not until the industrial revolution from 1760 that iron and steel began to influence the design of industrial buildings and bridges. The Crystal Palace[9] in London designed by Joseph Paxton[10] to commemorate the 1851 Great Exhibition was the first building of its kind to use prefabricated glass and cast iron as exposed structure. It was indeed a building form expressive of its function (Fig. 4.43).

[9]The Crystal Palace was a cast-iron and plate-glass building originally erected in Hyde Park, London, England, to house the Great Exhibition of 1851.

[10]Sir Joseph Paxton (1803–1865) was an English gardener, architect and Member of Parliament, best known for designing The Crystal Palace.

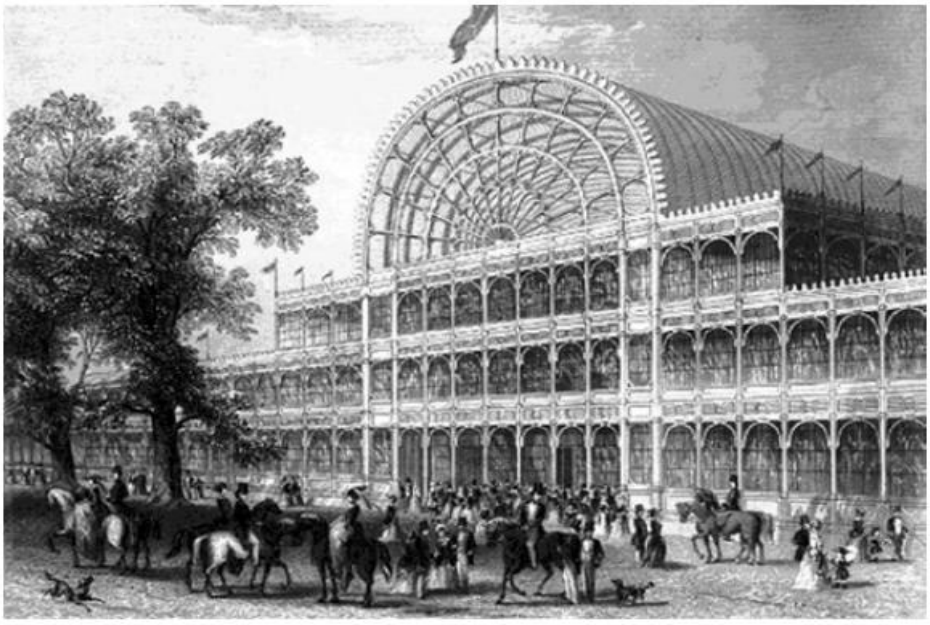


Fig. 4.43 Crystal Palace, London, 1851. Designed by Jospeh Paxton. Illustration originally from Tallis' history and criticism of the Crystal Palace, 1852. Wikipedia commons

This was an example of integrated architecture, whereby what you see on the outside is what you see on the inside. The effect of this new transparent architecture was tremendous, and whilst its main purpose was to display exhibits from around the world, there was no doubt that people were captivated by this extraordinary building.

The remainder of the ninetieth century was dominated by the Victorian period running into Art Nouveau[11] and Arts and Crafts.[12] These years were dominated by revivalist architecture and design combined with the earthy goodness of A and C and the Romanticism of AN. It was not until the German Bauhaus came along in 1919 that the philosophy of exposing building structure for its own sake began to appear. The leading exponent of this honesty of expression was Mies van der Rohe.[13] His Farnsworth House in Fig. 4.44, built in 1951, was such an example.

Inspired by the work of Mies, Alison and Peter Smithson, English architects from the UK, designed a school in Hunstanton, (Fig. 4.45) Norfolk, England, which came to be known as an example of 'Brutalist Architecture', because of the way the structure was expressed unadorned by any applied finishes. The steel structure was left exposed, whereas in conventional building, they would have been shrouded in concrete or had cladding applied.

[11]Art Nouveau is considered a 'total' art style, embracing architecture, graphic art, interior design and most of the decorative arts including jewellery, furniture, textiles, household silver and other utensils and lighting, as well as the fine arts.

[12]The Arts and Crafts Movement was an international design movement that flourished between 1860 and 1910, especially in the second half of that period, continuing its influence until the 1930s.

[13]Ludwig Mies van der Rohe (1886–1969) was a German-American architect who taught at the Bauhaus.

Fig. 4.44 Farnsworth House, 1951, Plano, Illinois by Mies van der Rohe. Author Tinyfroglet. Wikimedia commons

Fig. 4.45 Hunstanton School, Norfolk, UK, 1954. Architects Alison and Peter Smithson. © Archant. By permission of Eastern Daily Press

Figure 4.46 shows a view of the exterior glass wall of the recently completed Asia Museum of Modern Art in Taiwan by Tadao Ando. Whilst the building has many redeeming features architecturally, this view shows how diametrically opposed the diagonal steel structure has with the horizontal and vertical window framing. This relationship between structure and cladding has become popular with so many architects over the past few years, as could also be seen in the China Steel Corporation's building in Chap. 1 as shown in Fig. 1.32.

Fig. 4.46 Asia Museum of Modern Art in Taiwan by Tadao Ando, 2013. Drawn by author

Whilst the architect's intention was to express the diagonal structure, it has been done at the expense of integrating it with the façade.

4.7 Glass for Buildings

Glass is a very complex material. It comes in a variety of colours, textures and translucency. It has an associate named 'mirror'. It can be invisible. Qualities of transparency, solar resistance and reflection determine its specification for situations that require such qualities. Initially, its main use was to provide windows, enabling weather protection as well as views to the outside. It is not commonly a structural material (it has been used in special occasions), but rather a very weak and dangerous material. Glass walls, whether external or internal, present feelings of insecurity and a lack of privacy. They are acoustically weak unless double or triple glazed. Their use in corporate offices is based upon the designers and clients chasing an upbeat image of professional sleekness at the expense of human needs. How do you redecorate internal glass walls? How do you fit shelving to glass walls? Answer: you cannot. If the users get fed up with leading a 'transparent life', they will have to rip out the glass and put in solid or semisolid partitions.

4.8 Summary Diagram of Major Players

Figure 4.47 shows building as the architectural host discipline. Interior is the supportive facilitator for all activities. Product denotes all support systems.

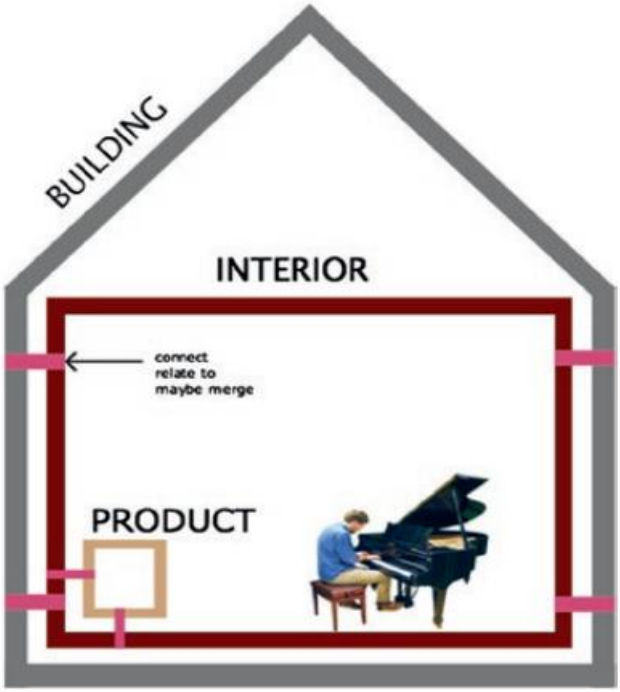
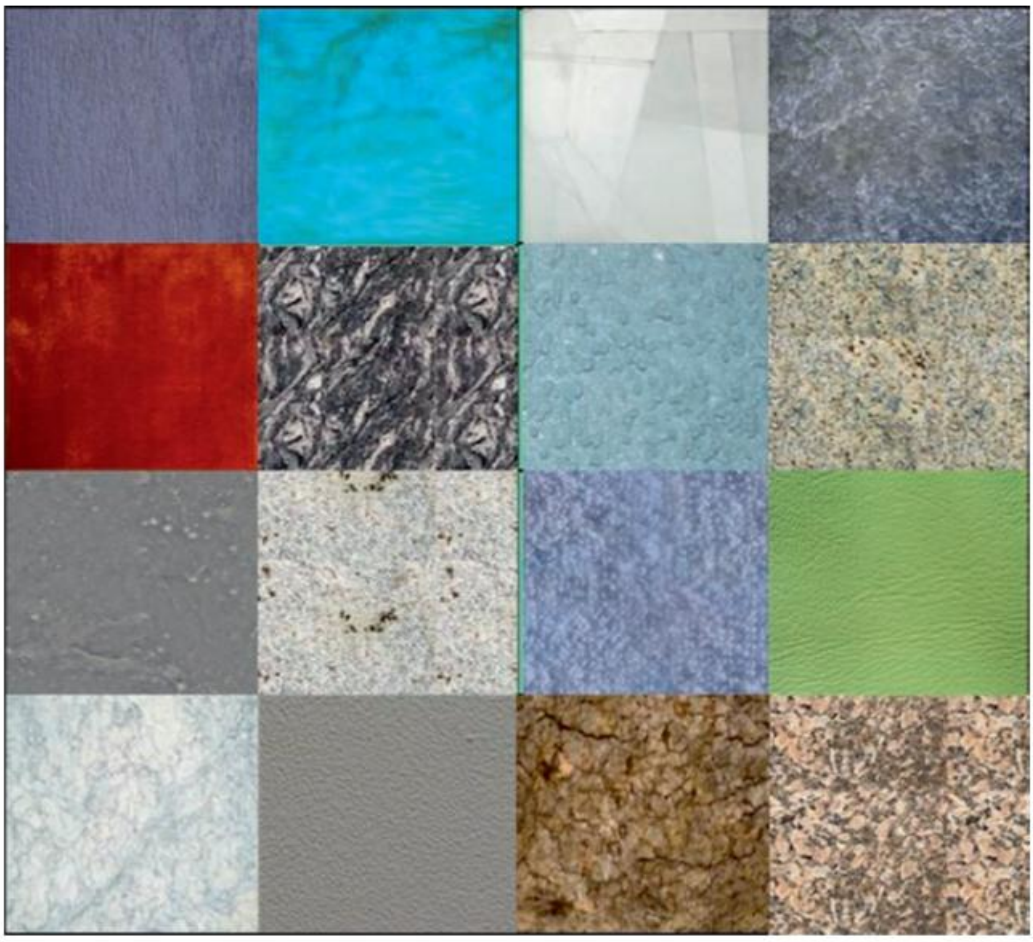


Fig. 4.47 Building, interior, product diagram

Chapter 5
Material Concept

Abstract Materials' concept overlaps with construction and colour concepts in quite obvious ways, so the chapter asks what governs selection. Acknowledging that there are two major groups: natural and artificial, I divide the chapter up into four location sections: enclosure is made up of unit type, frame and panel, and cast form. Structure is shown via three case studies. Surface finishes begin with dividing the section into applied or integral with structure and follow on according to the properties of materials. Support systems cover materials used in typical furniture forms, handrails and sanitary ware.



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A. Sully, *Interior Design: Conceptual Basis*, DOI 10.1007/978-3-319-16474-8_5

Thus, any material intended to assume a specialised form must first be conceived in its final image by the designer and then translated into the terminology used by specific product technologies.[1] **Malnar and Vodvarka**

5.1 Context—Keyword: Finish

Materials exist throughout the physical being of the interior, from structure to construction, finishes and support systems. An existing building shell and its proliferation of detail will provide the designer with a starting off point, as to whether to use, alter or masque the embedded materials. A new building being interadapted will again provide the designer with an imagined beginning, and the kind of contract will determine at what stage the interior designer begins to work on the interiors. In my own personal experience, I once had the opportunity of working with engineers and architects on a hotel project at a time early in the planning stage. As I was working from the inside out, I wanted to change the dimensions of the structural grid to suit the interior geometric concept that I was developing. All agreed with my proposal, which was a good example of intercollaborative working of architects, engineers and interior designers.

Suggested categories for location of materials:

ENCLOSURE—meaning walls, floors and ceilings that surround a space.
STRUCTURE—what holds the building up.
SURFACE FINISHES—what we see
SUPPORT SYSTEMS—elements that support the body as well as storage and display.
(Built-in or free standing)
I acknowledge that each of these categories may share the same material, but their location is determined by their function. A concept of materials is emotionally charged and defined by their function, properties and characteristics.

5.2 What Governs Selection?

Just as in every building, there will be a hierarchy of spaces from the most important to the lowliest; so, within each space a hierarchy of forms, surfaces and effects will serve to give identity and meaning to that space.[2] **John Coles and Naomi House**

There is a difficulty of isolating each of the concepts in this book simply because the visions of the designer can embrace all aspects of an interior and overlaps can occur

[1]Malnar and Vodvarka, *The Interior Dimension* (New York, Van Nostrand Reinhold, 1992) p. 255.

[2]John Coles and Naomi House, *The Fundamentals of Interior Architecture* (Lausanne, Switzerland, AVA Publishing, 2007) p. 88.

as I have previously stated. There needs to be a focussed discipline on each one to begin with so that their interconnection will strengthen the overall concept of the interior. So let us examine the sort of stages a designer could go though in making selections. It is assumed that the designer will have researched into the properties and characteristics of all materials for consideration and will have determined the level of appropriateness for the project. All materials advertise their scope of available form, which assists the designer in making the right selection. Considerations of safety, durability, maintenance, acoustics, aesthetics, haptic perception and comfort all have to be taken on board. Making the right selection can be bewildering when so many choices are on offer. For example, in the book *Materials for Architectural Design 2*[3] by Victoria Bell and Patrick Rand, there are 19 types of glass listed. There are 6 types in terms of their chemical consistency, 5 types of sheet glass and 6 types of special products for certain installations. The two main sourcing groups of most commonly available materials are natural and artificial.

5.3 Natural

Natural—wood from trees, stone and marble quarried from rock, bamboo and cork from trees, ceramics using clay from the earth but adding chemical products extend its use. (ceramic tiles would be the result of an industrial process). Figure 5.1 shows the interior of a sawmill where timber sections are cut from logs.

The journey of production of wood is remarkable: from tree to wood in raw state, to timber for use in section for carpentry and joinery, to decorative non-structural solid panels, to veneers and to wood chip for producing solid panels with resin or as loose insulation. In addition to this list, there are many new material by-products of wood being invented by combination and chemistry.

Fig. 5.1 Interior of the sawmill of P. Irving and Sons Ltd of Lancashire, UK

[3]Victoria Bell and Patrick Rand, *Materials for Architectural Design 2* (London, Laurence King, 2014) p. 12.

Fig. 5.2 Castings being made from pouring molten metal. Vanguard Foundry Ltd, West Midlands, UK

Fig. 5.3 Umami bowl designed by Ar. Rajat Sodhi of University of Michigan, 2014

5.3.1 Natural Source Through Industrial Process

Examples are iron and steel from ore, glass from silica, plaster from rock, concrete using cement from crushed rock and other additives, cotton from plant and wool from sheep. Iron ore exists in rock forms, and the iron is extracted in a huge container called a blast furnace as seen in Fig. 5.2.

There are some interesting experiments currently being explored at the University of Michigan, USA, in the engineering of micro- and nanostructured surfaces with anisotropic geometries and properties of polymers, metals and ceramics. The bowl in Fig. 5.3 is made from 0.5-mm-thick steel sheet and is in the form of a lattice structure.

5.4 Artificial

Examples of artificial materials are plastics to make furniture, laminates, cast resin products such as Corian, and textiles. One of the earliest injection-moulded polypropylene stacking chairs was produced by S. Hille & Co in 1963 designed by Robin Day.[4] The seat and back were the injection-moulded one piece, and the legs

[4]Robin Day 1915–2010 was a British chartered industrial and furniture designer.

were tubular steel. This Plana chair in Fig. 5.4 changes that combination by injection-moulded polypropylene of the whole chair including the legs, as one item.

Formica laminate, one of the first laminates to be produced, now refers primarily to the decorative product composed of several layers of kraft paper impregnated with melamine thermosetting resin and topped with a decorative layer protected by a clear melamine and then compressed and cured with heat to make a hard, durable surface. See Fig. 5.5. The decorative layer produced was initially in plain colours, but this was expanded to include patterns, graphics, photo images and the ghastly wood imitations. Worktops can also be produced with post-formed curved edges, concave for adjoining walls or convex for a leading edge.

Fig. 5.4 The Italian Kristalia Plana stacking chair 2014 from Nest. Co. UK. Designed by Lucidi Pevere studio

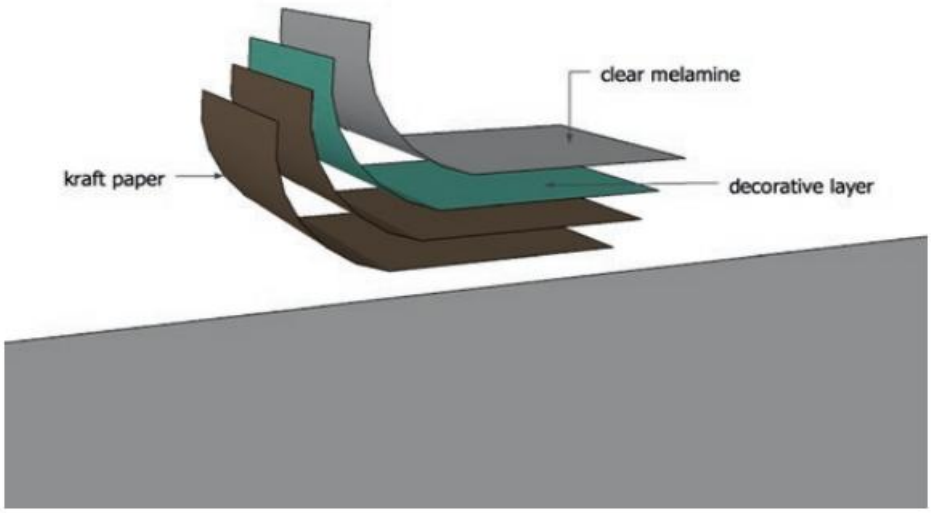

Fig. 5.5 The laminations of making a plastic laminate

The subsequent inventiveness in the plastic industry over the years has produced some more unwelcome imitations of materials such as wood, metals and fabrics. The worst example I have come across was in the refurbishment of a public house, whereby the old oak panelling had been replaced by new. The landlord proudly showed me the walls, and my initial reaction was favourable. As soon as he told me it was plastic throughout, I felt I had been deceived. The product was so cleverly made with wood grain in relief and even some woodworm holes to try and achieve an ageing look, as well as being so much cheaper than the real thing. Imitation of any kind is rather sad, and whilst the low production cost has its supporters, I have to say that there must be a better way. The solid oak wall panelling is reflective of a bygone age, and we should not expect to replicate the same in a new age of reduced budgets and economic downturns. It is the duty of designers to be aware of what is affordable and to ensure that design proposals are realistic to current social needs and the economic climate. Clients and owners searching for the 'wealth aesthetic' of dazzle sometimes created by exotic finishes of gold, leather and other bejewelled materials can on many occasions create the opposite effect on a visitor who will label the work as being vulgar and ostentatious.

The acceptable inventions that have been made are in the field of quartz-based agglomerates such as the ThinQ engineered stone series produced by Santa Margherita of Italy. Another more famous name is Corian made by Dupont, composed of acrylic polymer and alumina trihydrate, and is now described as a 'solid surface', which sounds contradictory for a surface as such, that has no great thickness. But Corian can be produced up to 19 mm thick so why is it not called an acrylic panel? It deserves special mention for enabling a work surface to embrace a sink bowl all made out of this material for the very first time, which of course means that a panel form is not entirely an accurate description of its capability.

Let us now examine the physical location of these materials as listed in Sect. 5.1.

5.5 Enclosure

Typically, this will consist of floors, walls and ceilings and will form the major determinants of the kind of interior being designed. Advanced technology of materials and CAD systems have enabled designers to merge the forms of walls into floors or ceilings in such a way that definition becomes difficult, as with the parametric interior of the Heydar Aliyev Center in Sect. 3.11.1. Figure 5.6 shows a hemispherical space, almost akin to being inside an igloo, which merges the ceiling with the walls and is on a semicircular plan. Such enclosures demand great 3D geometric skills, but these possibilities due to the wonders of CAD still have to answer the client's brief ergonomically and provide the best solution possible. Such forms demand new technology of materials and construction.

The enclosure will contain the structure of the building, as well as degrees of internal space divisions, cladding and finishes dependent upon whether the space divisions are load-bearing or non-load-bearing.

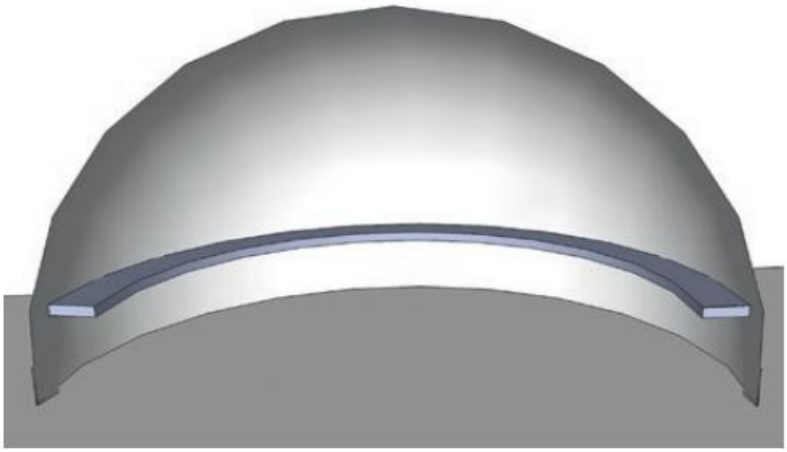

Fig. 5.6 Interior of hemispherical dome

In Chap. 3 (Sect. 3.7), I refer to the possible premeditated association of certain materials that a designer can make with regard to the floors, walls and ceilings. It is important to ignore this tendency and start with a fresh slate by working out the process of selection. Every project should be treated afresh by the designer at the outset, so that new problems deserve new solutions. I know that the more experienced designer has more baggage, which is likely to be carried from one project to another. By 'baggage', I mean certain favoured products or materials, or construction techniques that have proved themselves as being successful in terms of cost and a favoured client response. In a distinguished designer's work, there will be telltale signs of repeated specification or colours from one job to another. One may call this 'style'. Examples of such a 'signature' are as follows: Tadao Ando's[5] smooth concrete walls; Frank Gehry's[6] exterior titanium sheet cladding; engineer Anthony Hunt's[7] cross-tensioned steel framing; Eva Jiřičná's[8] glass staircases; Carlo Scarpa's[9] use of marble and stone; and Richard Meier's[10] obsession with the external cladding grid of panels or tiles. This is in no way a criticism but rather an understandable reuse of something that has been tried and tested.

[5]Tadao Ando, born in Osaka 1941, is a Japanese self-taught architect.

[6]Frank Owen Gehry, born in 1929, is a Canadian American Pritzker Prize winning architect based in Los Angeles.

[7]Anthony Hunt (born 1932) is an English structural engineer of numerous world renowned buildings, including the work for Norman Foster and Richard Rogers.

[8]Eva Jiřičná CBE RA (born 1939) is a renowned Czech architect and designer, active in London and Prague.

[9]Carlo Scarpa (1906–1978) was an Italian architect, influenced by the materials, landscape, and the history of Venetian culture and Japan.

[10]Richard Meier (born 1934) is an American abstract artist and architect.

5.5.1 First Inclinations

Materials, as selected for their visual and performance characteristics, are interdependent. They are not mixed except in the case of liquid forms. The form of their availability depends upon how they are sourced and what works need to be done for them to be ready for use. The three main routes are as follows:

Source……installed on site (rock, stone)
Source……factory……installed on site (doors, staircases, etc.)
Source……factory……worked on site……final installation (concrete, plaster)
And many variations of the above depending upon the material.
Let us examine a summarised growth and development of the curved building form (Fig. 5.7):

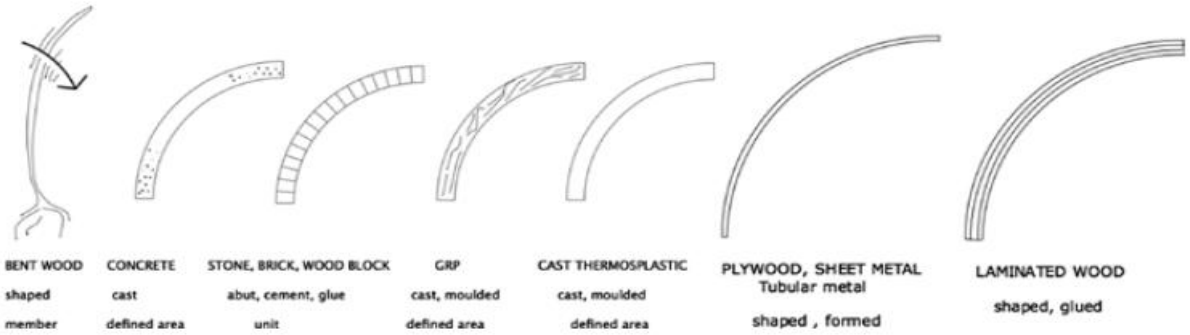

Fig. 5.7 Examples of the curved form

This survey is just one example of research into the evolution of a form through the use of various materials. Designers should know a little about the history of materials[11] in order to appreciate the present status of them. We begin with the bent branch of a tree from primitive times. These would vary from stout members, providing the main structure, to woven smaller members to provide a skin enclosure. Clay or mud would have been added to complete a protective shelter. Concrete was used from Roman times to provide flooring, walls and arches. Stone and brick are still popular materials for creating arches. Sheet metal was used in curved beaten form for body armour in the middle ages, as was wrought iron strip for weaponry and decorative elements to buildings such as railings. It was not until the seventeenth and eighteenth centuries that copper and iron sheet were used for roofing. From the mid-nineteenth century, sinusoidal corrugated sheet was used in building and it had the facility to be curved. In the late nineteenth century, tubular steel was born. Plywood was developed from the early- to mid-nineteenth century, and the twentieth century heralded the arrival of plastics.

[11]J.E. Gordon, *The New Science of Strong Materials* (Harmondsworth, Middlx, 1968); Yvonne Dean, *Mitchell's Materials Technology* (Harlow, Longman Group Ltd, 1996).

A simple classification for the substance of an enclosure could be as follows: Unit Type, Frame and Panel, and Cast Form.

5.5.2 Unit Type—Brick and Concrete Block

Figure 5.8 shows the reception space of the interadapted Serpentine Gallery, which is dominated by the nineteenth-century brick wall behind the desk. Zaha Hadid's signature flowing forms of the illuminated columns of tapered steel clad with GRP (glass-reinforced plastic) provides an agreeable contrast with the most basic and traditional of wall constructions.

5.5.3 Frame and Panel—Timber, Metal and Glass

Figure 5.9 shows the huge interior space of Terminal 3 at Shenzhen Bao'an International Airport, with a 1.5-km-long (1 mile) white roof punctuated by honeycomb openings that allow sunlight to filter into the expansive spaces. A moiré effect is created which is also reflected in the marble floor. The columns almost pale into insignificance because of their white finish and slender proportions. Some people may question whether the optical dazzle is restful for such a busy place.

5.5.4 Cast Form—Concrete, Reinforced Plaster and GRP (Glass-Reinforced Plastic)

An example of GRP can be seen in Fig. 5.8. Concrete was invented by the Romans so the use of this material has long been tested in various ways. It is composed of

Fig. 5.8 Reception space of the interadapted Serpentine Sackler Gallery, London, by Zaha Hadid Architects, 2013. *Photograph* by Luke Hayes

Fig. 5.9 Interior of terminal 3 at Shenzhen Bao'an International Airport, Guangdong, China. Designed by architects Massimiliano and Doriana Fuksas, 2013

water, a coarse granular material embedded in cement that fills the space amongst the aggregate particles and glues them together. It can be cast with or without reinforcement depending upon its structural role, into block walls, floors or columns. Its versatility combined with technological advances has extended its application as a decorative self-finished product as well as a sometimes hidden structure. It can be polished, coloured with added pigment or hammered with post-cast tools to achieve different textures. It can also be cast within textured sheet materials such as rough sawn timber to reflect that texture on the concrete finish.

Figure 5.10 shows that Japanese architect Tadao Ando has added The Teatrino, a third phase of this interadaption of the Palazzo Grassi—a contemporary arts

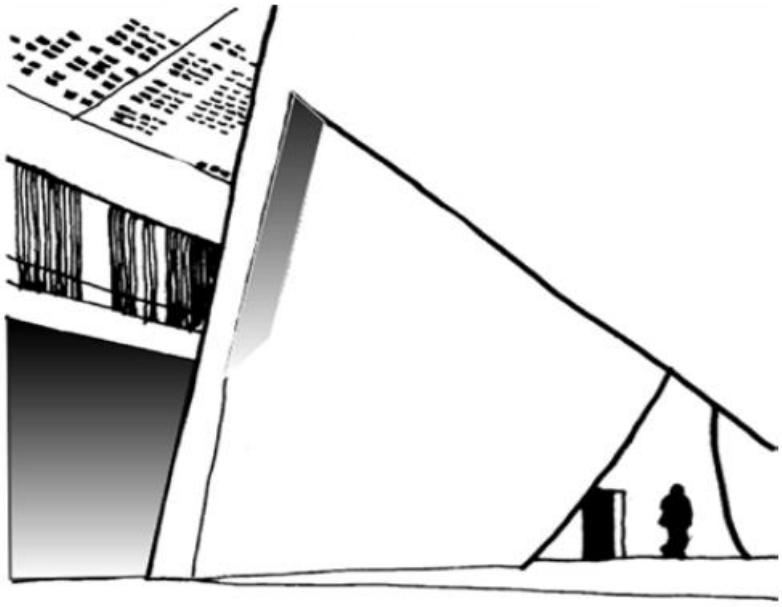

Fig. 5.10 Teatrino interior of the interadapted Palazzo Grassi, Venice, Italy, 2013. Designed by Tadao Ando. Drawn by author

centre inside an eighteenth-century palace in Venice. It is composed of an auditorium with a curving, polished concrete interior. Ando is a master of using concrete and was inspired by the work of Le Corbusier and Louis Khan.[12]

After interadapting both the main building and the accompanying Punta della Dogana into contemporary art galleries, Ando added this extra building as a venue for conferences, exhibitions and performances. The Teatrino occupies a space that once served as the palace's garden, then a theatre which has been closed since 1983.

5.6 Structure

A structure might be described as a series of components or 'structural elements' which, when fitted together, are capable of withstanding the loads and forces to which they are subjected.[13] **Roland Ashcroft**

The materials of the given structure will be an initial reference point. The design of structure usually falls within the remit of architects and engineers rather than within the scope of interior designers. Yet a project may demand that alterations to a structure may have to be carried out, in which case the relevant consultants would be engaged but under the guidance of the designer.

Load-bearing materials could commonly be

Concrete—framed structure of columns and beams of walls and floors.
Steel—framed structure of columns and beams of walls and floors.
Timber—for smaller sized buildings other than concrete and steel. Framed structures.
Brick, block or stone—walls.

All of the above would be sized according to the loads being imposed and be in situ or prefabricated.

Non-load-bearing:

Timber—normally creating stud partitions to be faced with plasterboard or other panel to suit.
Metal—framing to form partitions as with timber.

Floors—the framework can be as suggested above, but the whole floor area can be prefabricated infill of a variety of materials. The ground floor is usually built into the ground and does not require spanning as the upper floors do.

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[12]Louis Isadore Kahn (1901–1974) was an American architect based in Philadelphia, Pennsylvania, USA. He was a professor of architecture at the School of Design at the University of Pennsylvania. He was awarded the AIA Gold Medal and the RIBA Gold Medal.

[13]Roland Ashcroft, *Construction for Interior Designers* (Harlow, Longman Group Ltd, 1985) p. 1.

Apart from the function of the structure, the material is selected for possible exposure if it suits the interior materials concept of what is to be seen.

5.6.1 Case Study 6—Surfrider HQ

One example of a given structure is shown in Fig. 5.11. These are industrial sheds before interadapted into the Surfrider HQ as seen in Chap. 2 to provide exhibition, offices, meeting rooms and cafeteria. To understand the designers' approach to their rehabilitation, here is a mission statement by the designers (Fig. 5.12):

Each project is studied and developed with a high degree of specificity, with an overall approach oriented toward a particular attention drawn to the building "quality of use" and the search of an optimum in the relationship between site and architecture.

Each of the projects developed in the office are moved by a voluntary "common sense" approach to the notion of "environmental quality", the good knowledge of local geographical constraints, the comprehension and assimilation of current materials and construction techniques.

Here is the designers' statement explaining their design approach to these skeletal buildings, which involve the following responses where materials are concerned:

Fig. 5.11 Surfrider foundation European Headquarters: Biarritz, France, 2012. Designed by Gardera-D, Stéphane Bauche with acoustic consultants point d'orgue, Damien Dupouy

Fig. 5.12 Same as Fig. 2.8 in Chap. 2 showing completed interior

1. Survey to confirm, condition, materials, structural weaknesses and dimensional control. Determine what can survive and what needs removal or replacement.
2. Analyse existing geometry and proportions of plan, sections and the 3D volume.
3. The process of cladding, surfacing and filling will now take place.

The project for SURFRIDER FOUNDATION EUROPE headquarters is housed in two pre-existing industrial sheds. Existing volumes have been completely emptied and uncluttered, the skin envelopes isolated to meet the new 2012 thermal regulation and the existing roofs containing asbestos replaced by new steel sandwich panels integrating zenithal lightning as well as all the new technical fluids equipment.

The floor, entirely freed on an overall surface of 1000 m^2 can thus accommodate, under a single unifying roof, the two programmatic entities forming the new space: a free area destined for educational exhibitions purposes and a zone of tertiary activities for approximately 60 workers (open space, boxes, meeting rooms, cafeteria…)

The two different programs develop on each side of a gigantic wooden wave-*like partition wall.*

This technical element is made from a highly performing layering of sandwich composite wood panels habitually used in transportation construction (boats and trains construction industry) and allowing for a maximum treatment in term of acoustical issues (insulation + *absorption).*

The "wave" separates the volume in two parts and act as a real soundproof screen, thus permitting two distinctive programs to cohabit in a same generic and unifying space. The sound coming from the noisy exhibition area (young kids classrooms are common visitors) bumps and slides on the outside "reverberant" birch surface of the wave, being projected further up towards the under face of the

existing sheds roofs which are acoustically treated for absorption. The under face of the waves, beneath which long table elements are plugged, is entirely treated as a sound "absorbing" surface, thus providing a particularly comfortable zone for working. By "slicing" the existing volume in two different parts, using a long furniture element clearly identifiable as a "WAVE", SURFRIDER FOUNDATION users can thus refer to a strong identity-*maker element whose technical capacities also permits to profit from the generous pre-existing volume rather than clearly separate it into two different isolated entities.*

5.6.2 Pallotta Teamworks

Figure 5.13 is another example of an industrial shed being interadapted into office space by the imaginative reuse of steel shipping containers. Here is the architect's statement:

Taking cues from the mobile 'tent cities' created by the Client to shelter charity event participants each night, the 'breathing' tented islands were devised to act as giant air diffusers, minimizing the volume of conditioned air required for comfortable working. The tents also provide intimate and distinct work neighborhoods, distributing air and reflecting diffused light. Suspended from the roof support column grid, to avoid adding any new structure, they stretch in different directions according to programmatic needs of the workspaces. Their corners are anchored down by prefabricated shipping containers, which, at an average cost of $3400 each, were the least costly way to house private offices and support facilities. Air, power and sprinkler feeds funnel directly down from the roof, supported by the columns.

Entering the building through a large screen-printed sunshade, the reception area features an island desk modeled on *Buckminster Fullers' Dymaxion world*

Fig. 5.13 Pallotta Teamworks New Headquarters 'main street', Los Angeles, California, USA. Architects Clive Wilkinson, 2002. *Photograph* by Benny Chan—Fotoworks

map, a projection showing the continents as one continuous land mass, accurately reflecting their true surface areas, showing no boundaries or states. From this area, a dark blue open-ended shipping container forms a portal to the main volume of the building and onto the main street, leading on to the square with its executive tower, a 3-high six-pack of orange containers.

The refreshing adaptation of the shipping containers involves softening their metallic quality by the addition of timber cells which project into the 'street', hence providing more visual connections with the volume of the space. Furniture and softer floor coverings add to the comfort of usability.

5.6.3 Rockstar Villa

Fig. 5.14 Rockstar Villa, Majorca, by Alberto Rubio, 2013. Interior designed by Judith Paul and team from Pesch Wohnen, Cologne. *Photograph* by Oliver Mallah from England and Don Murray from Canada

The plan of this villa in Fig. 5.14 can be seen in Fig. 1.7 of Chap. 1. The structure is made of steel columns and beams combining with concrete and timber. The walls are painted plaster, and the floors are finished in polyester and polyurethane coating. The open organic design reflects the climate of the Balearic Islands with white being the dominant colour, which is the norm in hot climates as it allows the colours of vegetation and clothing to stand out.

5.7 Surface Finishes—Applied or Integral

Concrete or brickwork left untreated will expose an 'integral' finish. If the same materials are coated or clad with something else that finish is described as being 'applied'. There are many hundreds of materials to choose from, but the sequence of choice decisions could be as follows: (As I stated in the Introduction, I am assuming client's needs and aspirations have been taken into account)

5.7.1 Alliance with Structure

Materials can be selected for their harmonisation with the building structure in supporting its historical, aesthetic or material substance. Or they can be selected for their effective concealment of the structure.

5.7.2 Location

A material can be selected because of its intended dominance within the interior so that the majority of the structure, enclosure and support systems will be finished in the same material.

Or it can be selected for its punctuated effect or visual emphasis.

5.7.3 Apportionment of Area—Quantity

Repeat specification due to either large spaces or economy of cost and installation. Another major factor is availability of size. Tiles, whatever the material, will have a grid of lines, which is the joint between each tile, and this is a powerful aesthetic consideration. The selection should not be based on surface appeal without the grid characteristic.

Although having said that, the nature of ceramic is that it can be deliberately broken up into smaller pieces and installed as a crazy paving layout denying its grid like origins. Figure 5.15 shows the staircase egg-like form covered with such crazy tiling. It may appear to be a perverse action to take having gone to the lengths of careful manufacturing of a modular tile only to break it up into smaller pieces, but then faced with the prospect of covering such an egg-like surface with a rectangular grid would be insurmountable. The form asks for an applied liquid coating because of its multi-directional parametric quality. But as the designer wanted to have the ceramic finish, then this solution becomes acceptable. Of course, the crazy aesthetic needs to fit in with the overall concept of the interior, and viewed in that context, the final effect is of a muted textured surface.

Figure 5.16 shows a recently produced collection of smooth tiles that follow a grid and were on display in London's Clerkenwell Design Week 2014. English designers Edward Barber and Jay Osgerby created the collection for Domus, working with Italian ceramics brand Mutina, which produces the tiles industrially from glazed porcelain stoneware. The designers say:

'The collection has been inspired by London, the city where we live and work, its great variety of textures, such as aged bricks and wooden floors, and its irregular patterns made by imperfect geometric modules',

The range of colours has delightful names such as chalk, fog, pigeon, lead, ink and soot, and they each come in 15 different tones.

The size of a solid material for finishing purposes stems from the source as well as the production requirements for building purposes. The use of a material

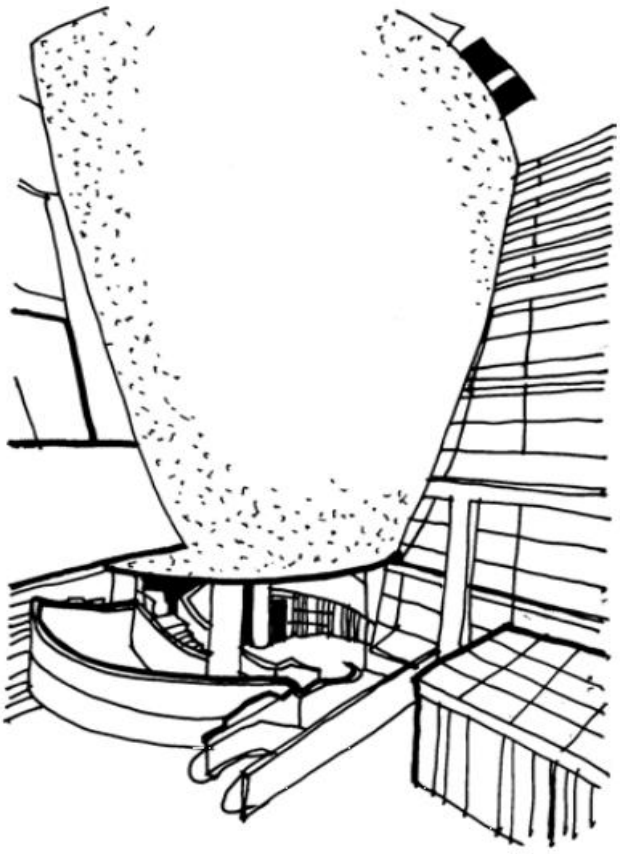


Fig. 5.15 Exterior of staircase in the Gyeongju Arts Center in Gyeongsangbuk-do, South Korea. Designed by Samoo Architects & Engineers, 2013

Fig. 5.16 Mews by Mutina. Homogenous porcelain stoneware tiles designed by Edward Barber and Jay Osgerby, 2014

in section, whilst being produced in certain lengths, can actually be connected to produce a visually endless run. In panel form, it will depend on the sheet size capability of manufacturing which is commonly 1220 × 2240 mm maximum. The maximum sheet glass produced by Pilkington is 6000 × 3210 mm in varying thicknesses.

5.7.4 Type of Skin (Applied)

Rigid cladding—ceramic, wood, plastic, metal, marble, slate, stone, plasterboard and mirror

Soft cladding—leather, textiles, wallpaper, pvc
Plaster/renders—concrete, plaster, terrazzo
Coatings—paint, resin, PVD (physical vapour deposition).

5.7.5 Soft or Hard

Materials can be selected for their appropriate hard-wearing properties such as for flooring or soft comfort finish for spaces that require it. Ceilings escape the need for wearability because of minimal haptic needs, so lighter weight materials would be acceptable, except in the case of exposed services and trunking systems, whereby specialised framing and suspension would be required.

5.7.6 Reflectivity

This is a property more associated with mirror or surfaces that provide a sheen such as gloss paint, PVD or melamine. All materials specified could be traced back to our natural primeval roots, whereby those environments are embedded into our genes and culture. The need for reflective surfaces may relate to our affinity with the water of seas, rivers, lakes and ponds.

I LOVE thee, lakes, and all thy glorious world,
Blue, wrinkled, mist-encircled 'neath the sky.
And far unto thy realm of waves impearled
My heart, bird-like, doth fly.[14] **William Wilfred Campbell**

5.7.7 Colour and Texture

Chapter 6 will examine the conceptual basis for colour, but here, I would like to summarise its consideration via the desired surface finish. As far as integral finishes are concerned, the colour is inherent within the material and should assist the designer in its selection. If wood is the favoured material for doing a particular job, it must be accepted that it is available in a variety of integral browns, plus black if ebony as well as its wood grain. So it is no use the designer thinking of wood and purple for example. The exception to this is that wood can be stained with certain colours but that has to be handled very carefully to avoid negative reactions.

Applied finishes, as listed under 'Type of Skin', have a greater range of colours and textures available. This makes the process of thinking easier in that colour can be the leading influence, knowing that finding the right finish will not be too daunting.

[14]William Wilfred Campbell, *Invocation to the Lakes*, © St. John: J.&A. McMillan, 1889.

When we choose a colour which is not determined by the building material itself, our choice will usually fall on one that is natural to some other material with which we are familiar.[15] **Steen Eiler Rasmussen**

Textures, patterns and graphics come into this category because whatever the composition or design of the surface, decisions have to be made on actual material selection. New coatings such as the Italian Ecomalta is a material made of different quartz sizes (thin, medium, maxi) according to the technical characteristics required and according to its use: floor, high traffic area or walls. In addition, the binding element is vinyl-acrylic polymer and water and it is applied by hand with a spatula like stucco for example.

Textiles embrace fabrics usually in the form of curtains and drapes, and upholstery for furniture. The process of selection of a fabric for a designer should be through the stages of needs such as

1 Softness, tactile quality
2 Adjustability and fixing
3 Texture
4 Colour/pattern
5 Fire retardant—if relevant

Graphic design elements are the illustrative part of interior design talking. Its combination of line, shape and colour is traditionally contained within the borders of the material or surface concerned. In some cases, as in the Google office on page 97b of my last book, the graphic design can be conceived of being in 3D. But it could also be an integrated part of the 3D concept of the interior in that the lines expressed by the enclosure or support systems could be connected and be part of the graphic content of the scheme.

5.7.8 Fixing/Installation Considerations (See Chap. 4 on Construction)

We have so far determined that selection of a material within the context of this book is based upon appropriateness and its colour and texture, but an important consideration, which can affect the aesthetic result, is the fixing/installation method. How often has an interadaption been ruined by unconsidered exposed fixings, almost as though the designer forgot about them, and their existence is a visual intrusion. There can be options of having concealed fixings, which is commonly favoured and easily achieved.

[15]Steen Eiler Rasmussen, *Experiencing Architecture* (London, Chapman and Hall, 1959) p. 217.

5.8 Support Systems

Furniture types can be free standing or built-in as an integral part of the building. It may even be difficult to distinguish the furniture from the building. Some units are so well integrated into the architectural design that they become a dominant design element as well as functional pieces.[16] **Kilmer and Kilmer**

Support systems cover furniture, handrails and any product loose or built-in that provides support for the human body in whatever posture and containment of associated objects. The loose items have to be designed or specified as to the degree of mobility regarding weight and ease of handling. The term 'furnishing' usually refers to a combination of 'hard' furniture including ornaments and lighting, as well as 'soft' furnishing covering carpets, upholstery and textiles. In many cases, these items may coexist with other items listed depending upon the project needs. I am unravelling this traditional grouping for the purposes of the conceptual analysis contained in this book. What is classified as furniture can be highly complex in that it covers a whole range of products which we can group as follows: (These headings suggest the controlling function as well an indication of location/use, and there can be overlaps of use such as a chest that can be used to sit on. The examples illustrated have been chosen because they are non-traditional solutions.)

5.8.1 Seating

Chairs, benches, stools and sofas
Material considerations: safety, support weight of figure, comfort, structure, ergonomics and upholstery

Snug offers a variation of the beanbag in that it is something you can sit IN as well as ON. It contains the sitter almost like a piece of clothing.[17] See my last book about wearing parts of an interior. It consists of a soft inner cushion surrounded by a sleeve, creating a cosy shell which envelops the user. The integrated belt on the top of the sleeve allows Snug to be adjusted to support your body in a variety of different positions. The material for the sleeve is specially developed by Kumeko. Jersey tubes stuffed with polyurethane foam are woven into the 100 % wool felt creating a 3D double-sided pattern. The wool felt retains the temperature inside the sleeve and makes the item durable, whilst the jersey tubes add soft padding. The colouring is a light grey matching the softness of the felt, with the yellow tubes dominating the interior. A nice touch is to see glimpses of the yellow tubing on the outside (Fig. 5.17).

[16]Rosemary Kilmer and W. Otie Kilmer, *Designing Interiors* (Fort Worth, USA, Harcourt Brace Jovanovich College, 1992) p. 494.

[17]Ref p. 188 of my book '*Interior Design: Theory and Process*'.

Fig. 5.17 The Snug designed by Kumeko from Berlin, Germany, 2014

Fig. 5.18 The 1/2 stool by Malgorzata Knobloch and Igor Wiktorowicz of WITAMINA from Poland, 2014

From soft to hard, Fig. 5.18 shows the '1/2' stool made of half of a tree trunk. The unique character of wood is contrasted with the technical, laser cut metal elements. The stool is very stable and durable. Thanks to the application of a protective sealing technique to the wood and metal the stool can inhabit both inside and outside. It can also be used as a side table. The beauty of the design is that the metal sides, although they meet at a certain point, are almost following a radius from the centre of the trunk of the tree. The bite taken out of the trunk allows some degree of harmonisation between metal and wood.

Fig. 5.19 Mac PC hybrid desk

5.8.2 Desking

Office, reception and home

Material considerations: work surface, structure, storage, efficiency, ergonomics and security, associated equipment, and service connections. Figure 5.19 shows a prototype design of a computer integrated into a desk.

5.8.3 Tables

Dining, conference, working, meeting, multi-purpose
Material considerations: work surface, structure and adaptability

The blade table utilises Mykon's innovative aluminium honeycomb technology that allows for a super thin design but with incredible strength. It is only 11 mm thick and spans 2100 mm long without the need for any type of bracing underneath, allowing for the table's design to be scaled back to a simple form. The legs are attached just underneath giving it the illusion that the tabletop is floating (Fig. 5.20).

Fig. 5.20 Blade table designed by Alexander Purcell Rodrigues of the USA and made by Mykon in the UK, 2014

Fig. 5.21 Counter of State Bank of India by workplace solutions, 2014

5.8.4 Workbenches/Counters

See Fig. 5.21.

Laboratory, office, working, kitchen, retail and bank
Material considerations: work surface, structure, storage, associated equipment and service connections

5.8.5 Shelving—Open

See Fig. 5.22.

Wall mounted, free-standing unit and display
Material considerations: structure, adjustability and access

Fig. 5.22 Fusillo multifunctional shelf made up of small wood sections which each rotate on a central axis. Designers and viceversa, London, Fabrizio Cazzulo and Simone Nunziato. Made in Italy, 2014

Fig. 5.23 Curved cupboards ash veneered MDF board. Glendower House. Designed by author

5.8.6 Cupboards—Enclosed Shelving

See Fig. 5.23.

Storage—wall mounted and free standing
Material considerations: structure, access to open and access to storage items

5.8.7 Chests

Storage
Material considerations: access, structure, extra use as seat and security

5.8.8 Cabinets (Usually with Glass Doors)

See Fig. 5.24.

Display and storage
Material considerations: structure, adjustability, access, security

The Casabella Onda two-door display cabinet is a stylish piece of high-quality contemporary furniture designed and manufactured by Italian furniture designer, Casabella. Made of solid wood with a lacquered high gloss finish, available in pure white, black and grey, the Onda two-door display cabinet has two beautifully curved glass doors with internal display shelves on the top and two curved doors cabinet on the bottom.

Fig. 5.24 Onda range by Casabella Co. Fine Italian Furniture, Italy. Originally designed by Giovanni Costantini, M.D. Casabella Co. www.casabellaonline.biz

5.8.9 Beds

See Fig. 5.25.

Single, double cot
Material considerations: structure, comfort and associated soft furnishing

Fig. 5.25 Nido Bed designed by Günther Thöny of Thony Projekt, Made of fibre-reinforced plastic

Fig. 5.26 Storage wall 'Freewall Systems' storage essentials Ltd

5.8.10 Wardrobes

Hanging storage of clothes plus shelving
Material considerations: storage and access

5.8.11 Storage Units

Warehouse type, libraries, office archives
Material considerations: structure, adjustability, access and location system
Figure 5.26 shows a free-standing modular storage and display unit of suspension files, box files and ancillary objects.

5.8.12 Handrails, Railings and Balustrades

Wall mounted and floor fixed
Material considerations: structure, safety and support

The staircase in Fig. 5.27 is concrete tying in with the concrete walls. The handrail is tubular stainless steel in a seamless continuous line. The vertical supports are at 90° to the handrail as shown in Fig. 4.39c in Chap. 4, whilst the thin steel rod balustrades are parallel to the handrail. Overall there is a feeling of lightness as well as strength.

Fig. 5.27 Staircase in Abedian School of Architecture, Australia, designed by Cook Robotham Architectural Bureau (CRAB), 2014. *Photograph* by Rix Ryan

5.8.13 Bathroom/Sanitary Equipment

Bath, washbasin, toilet, shower and bidet
Material considerations: hygiene, safety, structure, service connections, associated equipment and storage

The Symbiosis bath in Fig. 5.28 is the harmony of a bath and washbasin. The merger of two bathroom fixtures creates a form completely adapted to the human body. All plumbing installations are concealed from the human eye in the dual bottom, bringing to the fore the design purity of the object itself.

Besides the design aesthetic, Symbiosis is also a technologically advanced product, as water temperature and water pressure can be controlled at the touch of a button, whilst its built-in speakers enable you to play your favourite music on your mobile phone or device whilst you enjoy a relaxing bath.

Fig. 5.28 Symbiosis bath designed by Desnahemisfera, Ljubljana Slovenia, 2014. *Photograph* by N. Picogna/Ikon Picogna/Ikon

Fig. 5.29 Wave washbasin made by Artceram of Civita Castellana, Italy, 2014. Designed by Meneghello Paolelli Association (www.meneghellopaolelli.com)

The wave system in Fig. 5.29 comprises of a washbasin, taps, fittings, mirror and cabinet all contained within one fluid 50-cm-wide strip. Wave is made using KORAKRIL™: a material consisting of a mixture of acrylic resins and natural

minerals. It is sturdy, hygienic, static proof and resistant to staining. The beauty of this design is the concept of the flow of water and its liquidity, as well as merging support, basin and mirrored cabinet into one form. On behalf of correct terminology, I am taking the opportunity of emphasising that 'basins' are in bathrooms and 'sinks' are in kitchens, simply because I have become depressed by how many people refer to sinks in bathrooms.

5.8.14 Other Specialist

Coat/hat stand, grandfather clock, display sign or panel. This category will contain items special to a particular job.

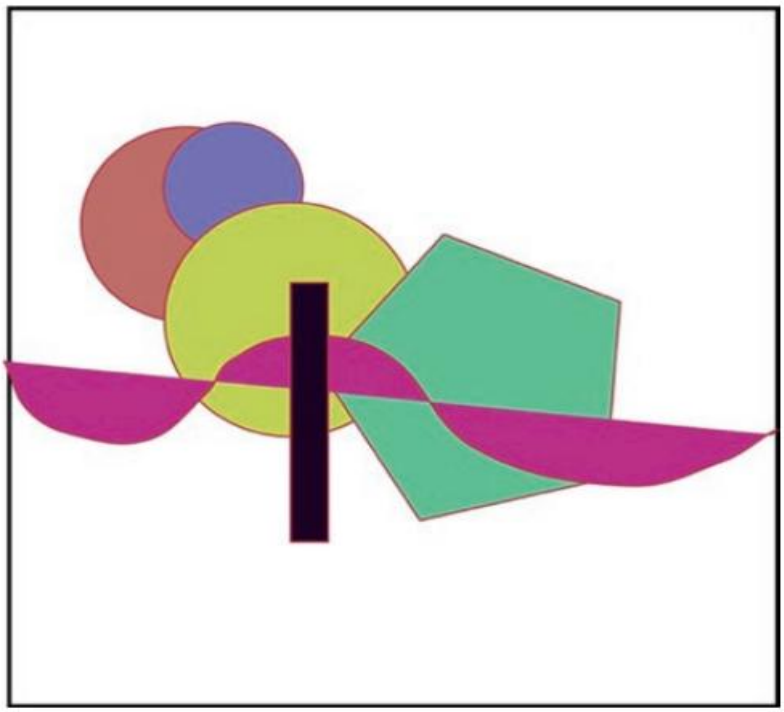
Kitchens are usually lumped together with bathrooms for trading purposes in the residential sector, even though the activities in both areas are distinctly different. The main connection is being the supply of water and facilitating drainage. Kitchens contain much of what has been listed above with the addition of specialist equipment such as cooker, fridge/freezer and sink. They have also changed in concept from being a small concentrated one room workspace to become a shared space with the general living space and hence have undergone an image change to one that hardly betrays any work being done whatsoever.

All of the above can be free standing or built in. Mobility is dependent upon how light or heavy an item is and whether services dictate permanent placement. For example, a lightweight chair can be moved by one person. The remainder can be designed to be moved by two people, sometimes with the help of wheels, casters or floor guides. Or they can be designed to be concealed, and by using moving parts, an item such as bed could be made available for use. The need for concealment can be due to shortage of space or the space concerned has a multi-function.

Material specification will be guided by the function and the use of the products concerned. Surfaces range from contact (work surface) to no-contact (side of a cupboard). Structure will range from framework, to framework and cladding, to panel carcase or box type. The overlapping concepts here will be 3D, construction and colour.

Chapter 6
Colour Concept

Abstract Colour can be discussed and used in so many situations that its ease of use can dangerously monopolise a designer's thoughts. This chapter begins by looking at the landscape of choice before asking the question of what governs selection. Colour can exist through a solid material or a coating. Colour is analysed in terms of how it can appear within an interior. The reader will learn that it is possible to determine the shape, composition, location and proportional judgement as a precursor to deciding on the colour.



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A. Sully, *Interior Design: Conceptual Basis*, DOI 10.1007/978-3-319-16474-8_6

6.1 Context—Keyword: Effect

Colour attributes include notions of harmony, discordance, complementary and contrasting colours, warm versus cool colours, spatial properties of colours and optical effects such as after-images and others.[1] **Robert Clay**

Interior designers must understand the perception and use of color and its resulting effects on human behaviour. Studies have shown that colour can create excitement, relaxation, calmness or cheerfulness and can even increase productivity in working environments. The way a person interprets or feels colour can vary according to experiences, education and cultural association with colour.[2] **Kilmer and Kilmer**

And a warning note:

Of far greater concern, however, are the buildings (particularly in their interior dimension) that use no systematic approach whatever, inflicting what Itten referred to as 'a severe stress upon sensitive individuals', the natural result of colouristic anarchy.[3] **Malnar and Vodvarka**

To develop a concept of colour, the designer must first of all be equipped with the theory and knowledge of colour in the abstract, effects of these colours on people and the effects of colours on people in interiors. It is highly probable that many designers do not have such background knowledge, and their position has been qualified by their overall capacity to provide a client with a full professional and unquestionable service. I do not intend to dwell on the theory as this has been very well covered in the media already. My self appointed task in writing this book is to unearth observations and examples which will extend our knowledge of how to think about the reasoning of why and how we use colour in interiors.

Colour exists in the materials and finishes used in the construction, decoration and furnishing of interiors. It is not a 2D field but exists in 3D. Lighting, both artificial and natural, also can produce coloured beams of light, which in turn can wash over a surface of the interior. In addition, the luminance and direction of a light source will allow the material colours to be seen. The handling and orientation of the source of daylight is balanced with the artificial lighting, so that the material colours can survive these environmental changes. Thus, the common perception that a client is presented with a mood board of colour samples that propose a 'colour scheme' is incomplete compared to the depth of meaning and content that colours and light produce. The progress in

[1]Robert Clay, *beautiful thing, an introduction to design* (Oxford, Berg, 2009) p. 137.

[2]Kilmer and Kilmer, *Designing Interiors* (Fort Worth, Harcourt Brace Jovanovich College Pub. 1992) p. 144.

[3]Malnar and Vodvarka, *The Interior Dimension* (New York, Van Nostrand Reinhold, 1992) p. 63.

CAD of the facility to present an interior perspective view with an almost life-like effect of the lighting and material textures is a great improvement on mood boards.

Whilst there are various sectors in interior design such as domestic, retail, office and so on, I feel it is dangerous to assign certain colours to these sectors as some books have tried to do. To me, design is an open book, which should allow the designer to approach each project afresh and to dip into the palette of colours in order to blend in with the other concepts being formed. The same tactic should apply to all concepts in order to avoid anything, which smells of convention and recommendation. In corporate interiors, a company will have an image and house style which will understandably be applied to all branch locations for reasons of continuity and, more importantly, marketing reminders to the buyers of their image. But in the free world, designers must have full and open choice of all things so that their solutions are not tied to convention.

6.2 The Landscape of Choice

6.2.1 Colour in the Abstract

The three primary colours are red, yellow and blue supported by black and white, which produces the spectrum of greys between black and white. All colours are seen in terms of their Hue, Value and Chroma. From this basis, colours have been developed in industry as follows (as recorded in 1972):

1 million colours—available to the human eye
27,580—ICI Colour atlas
11,037—Munsell colour atlas
943—Ostwald system
850—ICI Fibres atlas
589—DIN 6164 1960
237—British Standard (BS) 5252 colour range
101—BS 2660 commonly available range for paint industry
20–30—Textile colours
2–3—Product colours
1—Post Office corporate identity (in UK)

Instruction in Fig. 6.1b could be ‘Paint the wall blue’. This assumes that the wall has edges defined by the surrounding enclosure as in Fig. 6.1a, but this is conservatively presumptive when considering applying the colour blue. The aim is to apply blue to the wall, but the concept of shape, location and area of that colour

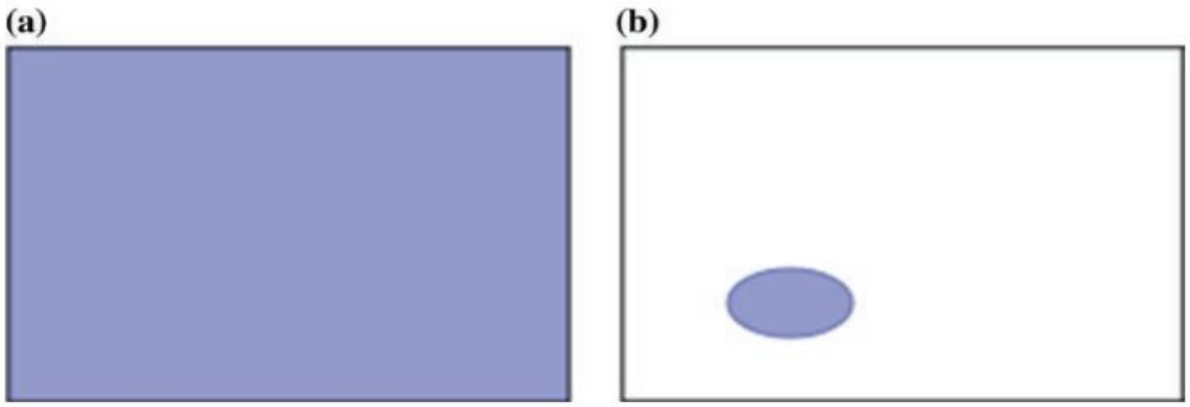

Fig. 6.1 **a**, **b** Two wall elevations

begins with a dot and then grows to whatever is decided relative to the overall interior as one example shown in Fig. 6.1b. So colour is either seen as:

INTEGRAL

- the materials used in construction
- products and support systems (furnishing)

Or

APPLIED

- coatings and finishes

Integral colours follow the specification of materials and products, which will dictate the contour, area and shape. These colours also have a strong bond with the structure and form of the building and hence have a higher degree of permanence. Applied finishes will present to the designer more scope of creating a geometry of shape that does not necessarily follow the contours of the enclosure or system of construction. But its relationship to the structure and form of the building is weaker than integral colours and is more easily replaceable. This not to belittle the status of applied finishes, but it is necessary to make clear to designers that this apparent freedom can lead to an ill-disciplined concept of colour. In other words, the more textures, finishes and colours available that fall into the wrong hands can lead to a disastrous array of content that amounts to visual confusion.

The pub interior in Fig. 6.2 is an example of simply filling a space of an old building with furnishing and finishes that supposedly fit in with the age of the building, but the end result is a mishmash of form and content dominated by the colour brown and a floor finish which says 'I am dirty anyway so a dark grey will conceal that'. Unfortunately, the pub trade in the UK in general have improved their eighteenth and nineteenth century premises by trying to match or enhance the original character of the building with stylistic reproductions that harm the connection with the past. The better examples provide a contrast by inserting the new that complements the existing, rather than aping it.

The Pint Shop pub in Fig. 6.3 is an example of how to successfully interadapt an old building (used to be a solicitors office) into a public house. The clean

Fig. 6.2 Typical London pub interior. *Photograph* by author

Fig. 6.3 The Pint Shop pub in Cambridge, UK. *Architects* Macaulay and Sinclair, 2013

uncluttered atmosphere echoes link with the past but also has a modernistic feel. The old-fashioned industrial-type pendant lamps with exposed cabling tie in with the simple yet effective ribbed wooden wall battens and the Windsor-type chairs. The white wall radiator unabashedly exposed even complements the vertical linear quality of the aforementioned. The main success of the interior is the colour of the applied finish of a light green/grey paint on the walls and the light oak floor finish. There are many shades of grey, but the designers have chosen one that is light enough to have the 'clean and fresh' look, as well as being a modern colour.

6.3 What Governs Selection?

Perhaps the most distorted topic that tends to dominate the interior designer's role is the use of colour. How many times have I heard that when it comes to colour, the interior designer is the master of all, as though we have some magic powers. The words 'colour scheme' come to mind as the most controlling feature of a designer's job. I hope that by now the reader will understand that the evolution of the grand concept is dependent upon so many factors and that the colour is a small part of it. The inflated importance of its status is because it can be visually dominant and is perhaps the first impression given to a viewer. Colour selection is dependent upon the following:

Single colour dominance
Compositional emphasis
Blend of colours
Location
Proportional judgement
Shape.

6.3.1 Single Colour Dominance

A single colour would be visually predominant, and to gauge, this would depend upon calculations of quantity and location. There are recognised interiors, which are known for their single colour dominance such as:

- swimming pools—white/blue
- public houses—brown
- hospitals—white
- law courts—brown
- little girl's bedroom—pink
- nightclubs—black

Figure 6.4 is an example of the Baroque style which, whilst it is terribly ornate, rich and complex, the colour gold is predominant to the human eye. The interior is a large space and is a place of worship where the design is meant to show how glorious a house of God can be, whilst making people feel humble in the presence of such a deity. The house interior in Fig. 6.5, however, is a simpler small space to digest, and despite some interesting angular geometry, is predominantly white in colour. In a strange reversal of emotional discharge, the minimalist house interior can also engender a feeling of calm and peace.

The simple application of colour has the power to reinforce or destroy architectural volumes, emphasise or balance objects in space and create tension or calm immediately in a room … The perception of colour, which is thus governed to a large degree by the material characteristics of a given object, is an important

Fig. 6.4 Interior of the Baroque Church and Convent of San Francisco, Salvador, Brazil. 18 Cent. *Photograph* by Fernando DallAcqua

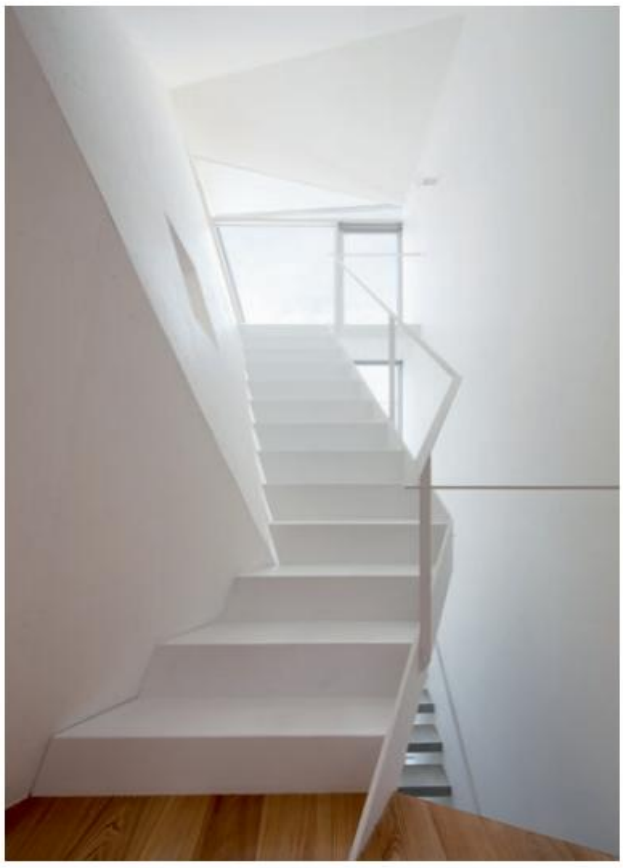

Fig. 6.5 Interior of folded house in Osaka, Japan. *Architects* Alphaville. *Struct Engineer* Mitsuda. *Photograph* by Kai Nakamura, 2011

design tool for the designer. Sensitivity to the effect of one kind of material versus another of the same colour demands skill, familiarity, and experience with a range of materials as well as the lighting conditions that would illuminate them.[4] **John Kurtich and Garret Eakin**

[4]John Kurtich and Garret Eakin, *Interior Architecture* (New York, Van Nostrand Reinhold, 1996) pp. 249, 250.

The following examples show the basic variations of space and how the impact of the predominant colour of red changes according to the size of the space:

The colour red is mostly predominant in Fig. 6.6 simply because the large volume multiplies the visual experience through 360°. There is more for the eye to see in perspective because the cone of vision allows it. Figure 6.7 with its low ceiling compresses the previous experience, and the threat of a heavy weight above reduces the impact of red. Figure 6.8 represents a confined small space which is always the most difficult task for a designer because of restricted viewing and a claustrophobic tendency. The closeness of the enclosure can increase possible tactile pleasure, but the reduced surface area minimises impact of colour. Colour in itself of course has no tactile properties, but when there are strong associations with certain materials, then one's memory makes the connection.

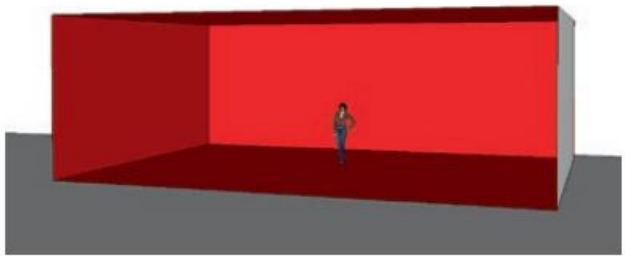

Fig. 6.6 Large space

Fig. 6.7 Wide low ceiling space

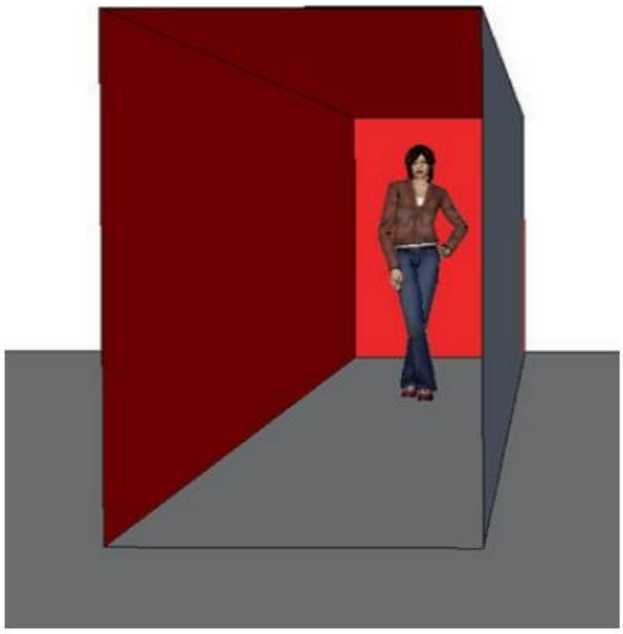

Fig. 6.8 Corridor space

6.3.2 *Compositional Emphasis—Where a Particular Colour(s) Is Dominant in Space or on an Object*

The analytical examples in Fig. 6.9 summarise some of the main visual compositions that designers have in mind when forming the concept of colour. There are of course endless variations to these ranging from simple to complex.

FRAME is some kind of border.
FOCUS implies that there is a visual focus such a fireplace or throne, or altar.
VERTICAL emphasis is made through strips of material wall cladding or applied coatings and could link with column structures.
HORIZONTAL emphasis can be the same as Vertical but is a landscaping visually relating to the floor and ceiling.
DIRECTIONAL is leading the person towards a particular place within the interior.
REPEAT MOTIF refers to some element that is small in area, but whose strength is in its repetition, such as a geometric or natural shape in textiles and wallpaper, or in a chair form in a theatre. DIAGONAL is less common than the Horizontal and Vertical because of its dynamically charged instability. It has now become a common element in Deconstructivist architecture.
DENSE DECORATION may have some Repeat Motifs within the design, but its main characteristic is in its proliferation of colours and complex shapes.

The following interiors demonstrate these groupings.

The Café in Fig. 6.10 (Directional) is such an example due to the floor pattern emphasising where a person walks and which also defines the borders of seating. The colour scheme here is basically black and white and was inspired by the work of graphic designer Saul Bass.

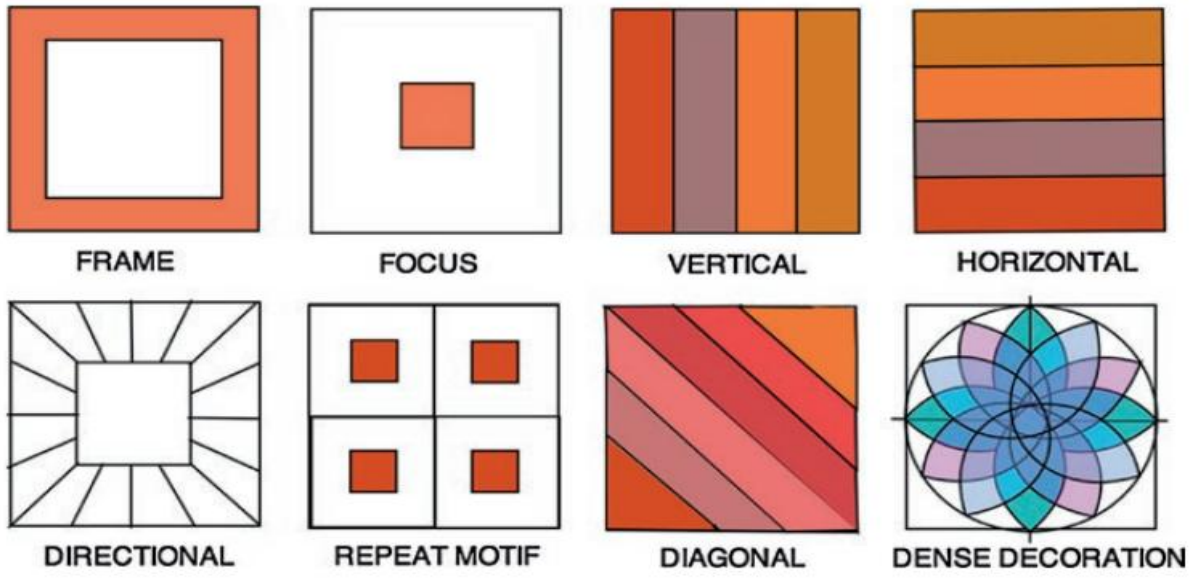

Fig. 6.9 Diagrammatic examples of compositional emphasis

Fig. 6.10 Perfectionist Café, Terminal 2 Heathrow. Designed by Afroditi Krassa, 2014. *Photograph* by Sim Canetty-Clarke

6.3.3 Blend of Colours

A blend is a combination of colours that work together to produce a cohesive scheme. In Fig. 6.11, the six seating/dining cubicles by the pool have a saw-tooth roofline, which is echoed inside the interiors. The enclosure of each one is painted with a different colour roughly going through the spectrum from a light red, yellow, orange, blue, violet to green. The perimeter face of each cubicle has a neon strip following the contour shape, and when these are lit up in the evening, they enhance the colours as well as the form of each cubicle. Another plus for colour

Fig. 6.11 Matisse Beach Club in Perth, Australia. Designed by Jenlin Chia of Oldfield Knott Architects. 2014. A series of 'Frames', 'Diagonal' and 'Repeat Motif'

emphasis is that these colours reflect in the pool, which softens and blurs the hard edge of the cubicle form. The concept of multicoloured lighting can invoke a feeling of a 'clubby' or trashy place, but in this case, I think the architects have achieved a place of quality and excitement.

6.3.4 Location

A designer has to be careful about placement of colours to ensure that they can be received and enjoyed by the user. For example, chairs and other seating forms come in all kinds of designs and materials and they usually occupy a space from the waist downwards.

Let us look at cinema design and focus on one aspect of the auditorium design, namely the subject of seating as shown in Figs. 6.12 and 6.13. Knowing that the solution will be a repeat of one chair design, the designer could begin by thinking of the rows of seating and the form of ripple that the back of each chair could produce. Then, the designer would think about the colour and how the repeat pattern will affect the space. All of this is 'below waist' area.

The designer should now merge the two considerations in Figs. 6.12 and 6.13 by searching for auditoria seating that satisfies both properties, as well as considering all the other aspects of auditoria design. But this approach is hardly adopted. Designers will search for the whole chair and how that fits the brief instead of looking at the landscape effect of the repeat pattern of one part of the chair, such as the contour and shape of the back. This failing is common with open-plan office design where designers look for ranges of furniture in terms of what one person

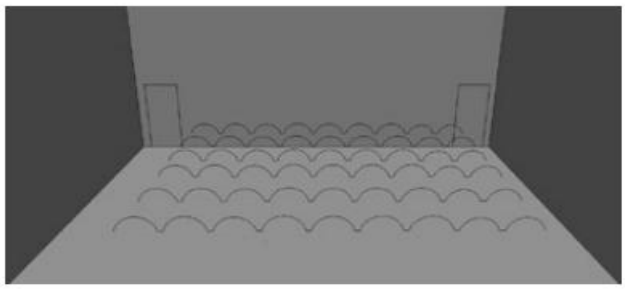

Fig. 6.12 Ripple of form of chair backs

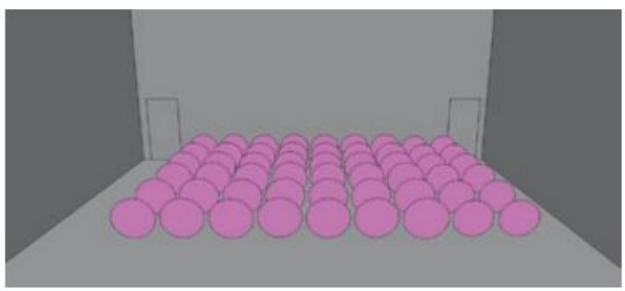

Fig. 6.13 Colour of seating

workspace looks like, and the planning of a whole floor of an office. A perspective view of the whole office broken down analytically to see the repeat of chair structures, desk supports, desk surfaces and so on will not take place, as decision-making will be governed on the previous sentence. This task of breaking elements down into their unit parts is fundamental to the conceptual thinking I am promoting in this book.

The cinema in Fig. 6.14 (Frame and Focus) is made up of the colours red for the seating and screen, and black and white for the enclosure. What is so striking is that the black strips delineate where the seating is fixed, whereas the white is the spacer. The chairs' structure and upholstery are the same red finish. The black and white strips are a continuous band wrapping the width of the cinema floor, walls and ceiling. This of course echoes the framing of the screen.

The neutrality of the colour Grey is used here in this interesting seating/lying form to blend in with the floor.

It is called 'Floorscape' which is, as the title suggests, a floor-based support system as seen in Fig. 6.15 (Blend). The system comprises of a set of different modular triangulated forms which can be rearranged in a number to suit. The underframe is made of black-powder-coated aluminium with faceted black leather cushions. Each unit just butts up to the other without any connectors. The design has that scaly crocodile look that suggests the whole thing could crawl and slither away. It is something that, because of its low lying position, invites a person to walk onto it and of course that is the designer's intention.

Germany's Walter Knoll Furniture exhibited their recent range of upholstered furniture shown in Fig. 6.16 (Repeat Motif) which is very colourful and made more so by the black/grey solid bases. 'Seating Stones' are an attempt to provide a natural landscape within interiors. The new seating designed by Ben van Berkel is body foam-moulded with steel subframe. They are designed to be independent or can form a close knit formation. Usually, upholstered sofas and armchairs are

Fig. 6.14 Fogo Island Inn, Newfoundland, Canada. Saunders Architects, 2013. *Photograph* by Alex Fradkin

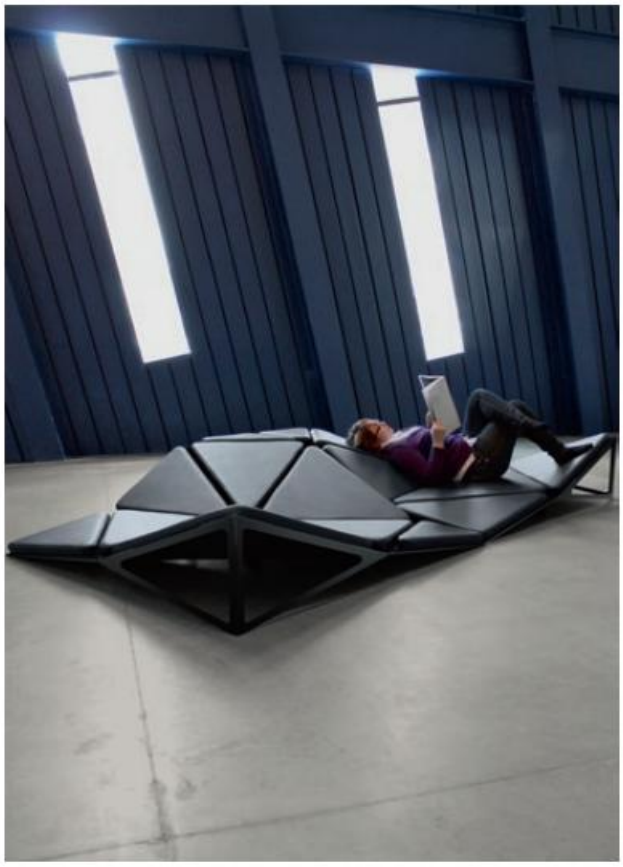

Fig. 6.15 Floorscape designed by Dave Picketts of Cleveland, USA, 2014

Fig. 6.16 Walter Knoll's Seating Stones Furniture. Designed by UNStudio/Ben van Berkel, 2014

made in one-coloured fabric or leather, so it is quite refreshing to see such a bold emphasis of colour for the bodily contact area only. The exhibition stand here has a white floor to set off the furniture supported by two brightly coloured walls and one muted pale green.

6.3.5 Proportional Judgement

This is about deciding on the respective amounts of each colour within a scheme.

Colour can sometimes be taken as a follower of the other concepts in this book, in that the designer's sequence of thought could begin with the instigator concept of 3D form, followed by the selection of Materials, which in turn come in certain colours. These would be 'integral' colours as opposed to applied colours. The quantity of integral colours embodied in Fig. 6.17 (Structure, flooring for example) is tightly controlled in terms of proportional quantities, whereas applied colours present the designer with a little more flexibility in quantities used. Figure 6.17 (Vertical and Horizontal) shows the Pallotta Teamworks' office, which is using an industrial shed and shipping containers as the core idea of space use. The form of these containers delineate a surface and edge within which a colour is applied, namely a minority of blue and a majority use of yellow.

Here is a statement by the architects:

Color Inspiration:

Color on the project was very deliberately used to choreograph views and distinguish more public and neighborhood zones. A dark blue open ended shipping container creates a deliberate transitional experience from the bright entry into the interior landscape beyond, framing ones initial view into the dramatic white tent landscape. Set against the crisp white of the tents is a palette of varying blues used at the four corners of each neighborhood. The palette was developed to subtly vary the views and enhance the sense of depth and composition of neighborhood forms without confusing the clarity of the tents. The café container and 'tower on the square', the most public zones, 'speak out' strongly in this sea of white and blue painted in a brilliant orange. Gloss paint is used for all these forms to enhance the effect of the bright colors. Set against this saturated palette is a variety of more muted earthy tones used on the floor of the tent neighborhoods. In

Fig. 6.17 Pallotta Teamworks New Headquarters, Exec Offices, Los Angeles, California, USA. *Architects* Clive Wilkinson, 2002. *Photograph* by Benny Chan—Fotoworks

combination with the exposed concrete in the circulation zone, this ground plane is reminiscent of the actual ground present in the mobile tent cities that the charity creates.

Terms are used which describe the emotional effect intended such as choreograph, transitional, bright, dramatic, palette, depth, composition, clarity and muted earthy tones. The spaces have been designed with colour in mind and not simply as an 'add on'.

6.3.6 Shape

The shape of a colour is dictated by the enclosure or support systems if integral to a product. The Birkbeck Centre (Dense Decoration), seen in Chap. 3, is used here in Figs. 6.18 and 6.19 to show how applied colour through gloss paint and can powerfully dictate a geometry foreign to the building's form and structure. The inspiration for the colours came from Andy Warhol's[5] series of images of Marilyn Monroe.[6]

Fig. 6.18 Birkbeck Visual Media Research Centre, London, 2007. Designed by Surface Architects, London

[5]Andy Warhol (1928–1987) was an American artist who was a leading figure in the visual art movement known as pop art.

[6]Marilyn Monroe (1926–1962) was an American film actress, model and singer.

Fig. 6.19 Another part of the Birkbeck Centre

Fig. 6.20 The Rayen Restaurant in Madrid. Designed by Fos, 2013

Figure 6.20—(Focus) Retail projects commonly have an exterior elevation open to the street or inside shopping malls. Therefore, the exterior treatment is linked in with the interior identity of the shop. In this case, it is a street in Madrid. A multidisciplinary team of interior designers and art directors based in Madrid and Barcelona, created an ephemeral installation that gives a visual perception of a projected beam of light from above. They used over 250 m of yellow tape, pineapples, painted pieces of art, lawn furniture and a lamp, creating a visual spectacle between perspective and coloured volumes. Although this is not an interior, the shape is advertising the restaurant, and such visual games are intended to entice prospective customers.

Chapter 7
Lighting Concept

Abstract This chapter divides the topic into two major groups: artificial which looks at typical lighting installations, and natural, which looks at how daylight enters our buildings. Artificial light can be controlled by on/off switches but also at source in terms of the colour and light intensity. Natural light cannot be controlled at source but there are various ways of adjusting the amount of daylight entering the building. Location and orientation of the building are fundamentally important to the designer for these adjustments to be designed.

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7.1 Context—Keyword: Mood

Light brings interiors to life and is important to our activities and perception of the world around us. By controlling and designing with natural and artificial light, the interior designer can create striking design concepts in interior spaces and provide for the visual needs of user activities.[1] **Kilmer and Kilmer**

Intelligent interior design recognises lighting's ability to influence the way in which occupants see a space and considers lighting a primary means of giving a space special character.[2] **John Pile**

This chapter is focussing upon how the concept of light, using both artificial and natural, is formed assuming that the designer is equipped with the technical and theoretical knowledge of optics, how we see, available lamps and their effects, regulations IEE (UK), IEC (International),[3] required illumination levels and fittings available both built-in and free standing. The point about light in a building is the creation of a duality of light and shade. The light is intended to illuminate a space, surface or object. The surrounding area is in shadow. But this is not to be ignored because of the lack of illumination. On the contrary, beams of light bounce off their intended target and reflect into the shaded spaces. Therefore, there is a gradient effect of light intensity. Lighting is perhaps unique by comparison with the other concepts listed in this book because its planning (see Chap. 3, pp. 57, 58) and formulation fall into two distinct areas that is open to change in effect and distribution.

7.1.1 Artificial Light

Installed fittings that depend on an off/on switch or other programmed controls can produce a variety of effects for a variety of functions. There are conditions where lighting control is dependent upon sensors such as in office buildings, for example where a gradient of lighting control is applied according to the amount of daylight entering each floor. The perimeter work areas may have no lighting on as opposed to those spaces nearer the central core of the building. Other sensors can aim at energy efficiency, dimming controls, movement and colour changes. All artificial lighting is designed and planned assuming total darkness. Any lighting scheme, however dark and low the level of illumination is, will have additional lighting for two reasons: (1) Emergency lights strategically placed if the main lighting fails. These will run on independent generators. (2) Lighting for maintenance and cleaning.

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[1]Rosemary Kilmer and W. Otie Kilmer, *Designing Interiors,* (Fort Worth, USA, Harcourt Brace Jovanovich College, 1992) p. 317.

[2]John Pile *Interior Design,* (New Jersey, USA, Prentice Hall Inc. 1988) p. 293.

[3]IEE—The Institution of Electrical Engineers. IET—The Institution of Engineering and Technology.

7.1.2 Natural Light

Is the amount of daylight entering the building through various openings, usually through glass, during the course of the day and this is known as the 'Daylight Factor'. This is based upon three paths along which light can reach a point inside a room through a glazed window, rooflight, or aperture as follows:

- Direct light from a patch of sky visible at the point considered, known as the sky component.
- Light reflected from an exterior surface and then reaching the point considered, known as the externally reflected component.
- Light entering through the window but reaching the point only after reflection from an internal surface, known as the internally reflected component.

The sum of the three components gives the luminance level (lux) at the point or surface to be considered. All of this is dependent upon changing external climate conditions, which is beyond the control of the designer. Daylight enters the building at pre-defined locations as far as the interior designer is concerned, simply because the work is normally carried out on a given building. However, it may be possible for designers to adjust existing openings or create new ones depending upon the constraints of the particular project.

The development of a lighting concept must utilise both of these conditions where they affect the interior. There are many interiors that are totally enclosed without any daylight possible such as certain nightclubs, theatres and cinemas. As mentioned in Chap. 3 on p. 57, light enables us to see what we are doing and where we are going. When we look at wild life, we observe that moths are attracted to any light that lights up the dark, which is to do with phototaxis; an organism's automatic movement towards or away from light. On the other hand, we have creatures who hide from daylight by sleeping and only come out of their habitat at night. These are called 'nocturnal' such as the bat, owl, hedgehog and badger. Human beings generally do not like being in dark spaces and will be attracted to any light source, just as they prefer to be close to daylight if the opportunity arises. These are fundamental needs that designers cannot ignore.

7.2 Artificial Light

Artificial light can, of course, be used very effectively, especially when it is altered by the use of reflective or translucent materials. In this manner, light can be used to obscure as well as reveal, to dissolve detail as well as enhance it.[4] **Malnar and Vodvarka**

[4]Malnar and Vodvarka, *The Interior Dimension,* (New York, Van Nostrand Reinhold, 1992) p. 251.

Built-in lighting ranges from very practical task lighting to decorative lighting in fittings that are either suspended (pendant), surface mounted, recessed, free standing or concealed, so we need to examine this range in more detail:

General or ambient lighting
Task lighting
Accent lighting
Decorative lighting
Illuminated objects

For light to be coloured, it must be noted that the light source can also be a coloured lamp or the white light is passed through coloured filters. Light is experienced from either the source or the resultant surface or object that receives the beam of light. Generally speaking, the beam is not seen unless for theatrical effect or through laser beams. A concept of light will either be formed initially in relation to the designed space and enclosing elements of the interior, or it will be formed as a leading concept, which may dictate or influence the 3D massing of the interior. Whatever is decided, the two malleable dictates for light will be effect and source/location. These will then fall into the categories listed above.

7.2.1 General or Ambient Lighting

General lighting (Fig. 7.1) is a uniform spread of light within an interior generally achieved through many ceiling light fittings beaming down into the space. Or concealed fittings can beam up onto walls or ceiling producing an overall reflected light. Examples are open planned offices, sports auditoria, airports and travel stations. The light source is not as important as its effect.

The interior view of Shenzhen Bao'an International Airport in Fig. 7.2 is a large space requiring general lighting throughout. This is achieved with fittings placed

Fig. 7.1 General lighting diagram—usually uniform

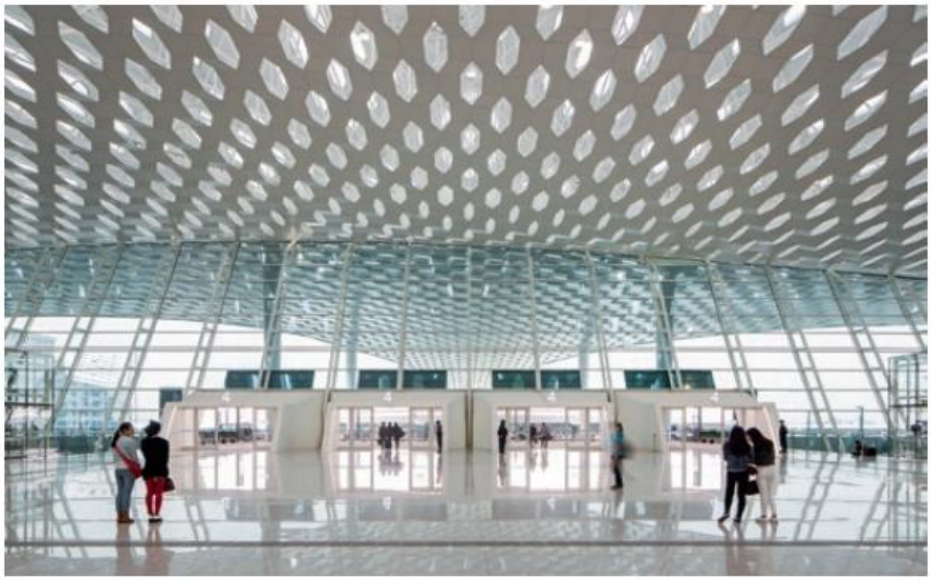

Fig. 7.2 Interior of Terminal 3 at Shenzhen Bao'an International Airport, Guangdong, China. Designed by architects Massimiliano and Doriana Fuksas, 2013. *Photograph* by Leonardo Finotti

Fig. 7.3 Laboratory interior of the Vortex Centre of the Gippsland Water Factory, Victoria, Australia. Designed by DesignInc. of Melbourne, 2010

within the ceiling grid of elongated hexagonal openings. With large amounts of daylight entering the external envelope and white being the dominant colour, the effect is very bright indeed. This is compounded by a reflective floor surface, which adds to the general illumination.

Figure 7.3 shows a laboratory which requires as much overall illumination as possible simply because the nature of laboratory work is moving from one place to another for work or access. The fluorescent tubing is in fittings that diffuse the light downward but at the same time reflect off the curved white ceiling to provide the desired result. Figure 7.4 by contrast is a cultural centre and therefore is not such a small intense space. The atmosphere is serene and smooth with fluorescent lighting built into the ceiling fabric in an organic pattern that does not follow any logistic placement yet still achieves a uniform spread of light.

Fig. 7.4 Heydar Aliyev Center designed by Zaha Hadid Architects, 2012. *Photograph* by Iwan Baan

7.2.2 Task Lighting

This is light to enable a particular task or activity to take place, ranging from simple domestic to industrial and commercial. The light source C in Fig. 7.5 is usually placed close to the working surface, not only to enable the task to be carried out but also for the operator to control the power or adjust the fitting in any way. The main aim is to usually project a beam of light onto the work area and the person maybe sitting or standing at a work surface or a piece of machinery. Before computers entered the office arena, the desk would commonly have a desk lamp to illuminate the working surface. Now that the computer/laptop screen is used, this traditional form of lighting has to be handled carefully to avoid beaming onto or reflecting into the screen. Figure 7.5 shows the two other common locations of task lighting.

A. Floor standing light fitting
B. Ceiling narrow beam spotlight
C. Desk-mounted light fitting

Adjustment would be a common need.

Figure 7.6 shows how the task lighting is concealed enough to give light to the working area but at the same time avoid glare onto the laptop screen. This particular scheme is designed so that the desking units can slide along tracks so as to create different size spaces between each one. In offices generally, the most common form of lighting from the 1950s onwards was general lighting from the ceiling using fluorescent fittings, either surface mounted or recessed. Eventually, improvements were made to the diffusers so as to avoid glare as can be seen in Fig. 7.7a. Figure 7.7b shows a different office that required a higher level of illumination; hence, the fittings are visually brighter. It will be noted that in these offices there

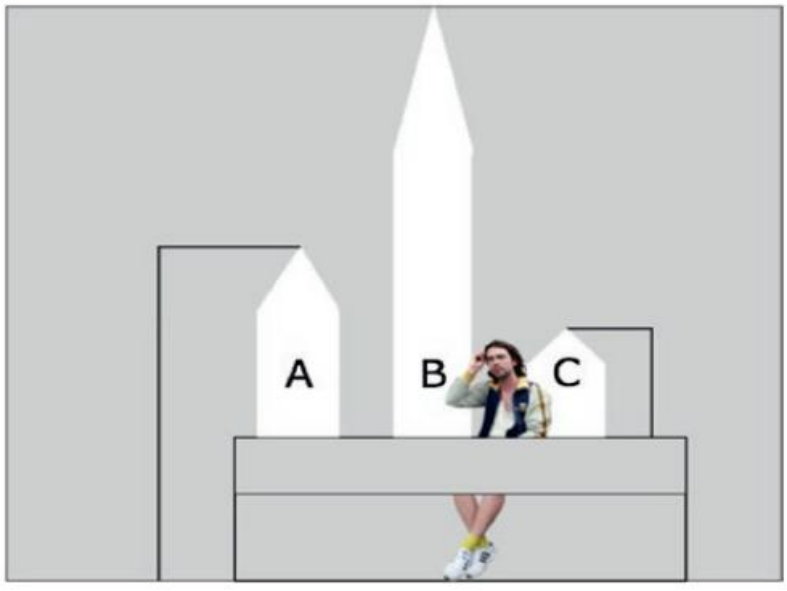

Fig. 7.5 Task lighting diagram

Fig. 7.6 Desk at Environmental Grantmakers Association offices in New York designed by Architect and fabricator Taylor and Miller. *Photograph* by Emile Dubuisson, 2013

Fig. 7.7 **a**, **b** Office interiors by kind permission of Ceiling Tiles, UK

are no task lights to be seen because the lux level on the work surface is adequate for the tasks in hand. Caution must be taken; however, if the overall illumination is so bright, people can begin to complain of headaches.

Figure 7.8 shows a general meeting/workspace in Bond University's Soheil Abedian School of Architecture in Australia. Apart from a refreshing series of organic spaces punctuated by bursts of colour, the activities are carried out under ceiling pendants that provide the light necessary at the working plane. This informal layout contrasts sharply with the mechanical, almost robotic interiors in Fig. 7.7a, b.

Fig. 7.8 Lighting for a general meeting/workspace in the Abedian School of Architecture, Australia. Designed by Cook Robotham Architectural Bureau (CRAB), 2014. *Photograph* by Rix Ryan

7.2.3 Accent Lighting

Accent lighting is about directing light onto an object or part of the interior. This can be for special installations such as museums, galleries, exhibitions, retail and events where display and communication is the medium. Otherwise, the purposes are for dramatic emphasis such as in hotels, restaurants, bars, theatres and cinemas.

The diagram in Fig. 7.9 shows the following:

D. Wallwasher from floor level
E. Narrow beam spotlight onto object
F. Wallwasher from ceiling

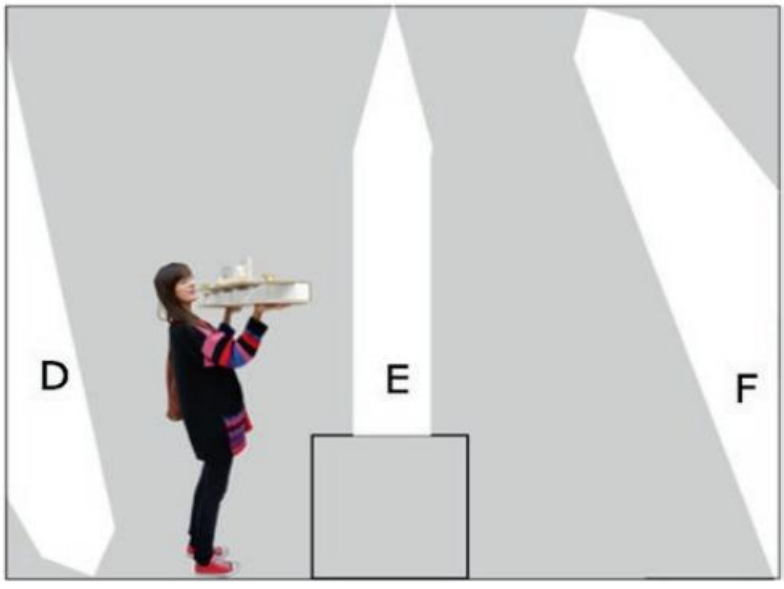

Fig. 7.9 Accent lighting diagram

Fig. 7.10 Dafen Oil Painting Village art gallery exhibition hall interior. Author Aihofanz, 2010

Adjustment of fittings would only be a requirement when displays change.

Figure 7.10 shows a gallery space with accent lighting onto the paintings. The concept here is to create a fairly dark interior of which the only illumination is achieved by the strategically placed track spotlights. Designers have to be careful to acknowledge the following:

- Avoid glare into the eyes of onlookers,
- Ensure even spread of light over the object and
- Maintain a visually stimulating environment.

One of the requirements of a gallery that changes its displays every so often is that the lighting plan affords the capability of adjusting the lighting to suit either different products for display, or the screens/partitions can be moved to a new layout.

The Placebo Pharmacy in Fig. 7.11 demonstrates a different method of highlighting an object by illuminating the translucent display panel behind the shelves of goods on display. This technique has also been used to good effect in bars as can be seen in Figs. 7.12 and 7.13. It is based upon the moth attraction principle, where people are lit up by the illuminated surface.

Figure 7.14 shows a popular way of creating intimacy on each table in the St. Alban restaurant by spot downlighters. White tablecloths, the sparkle of glasses and blue chairs against a dark background complete a quiet and soothing atmosphere that is all about the customers, and a non-assertive interior.

Fig. 7.11 Placebo Pharmacy in Athens. Designed by Klab Architecture/Konstantinos Labrinopoulos, 2010. *Photograph* by Panos Kokkinias

Fig. 7.12 Bar counter with RGB controller for changing LED lighting colours through translucent top and front. Courtesy of Myyour, Gazzo, Italy

Fig. 7.13 Penthouse bar in ME Hotel, London. Designed by Foster and Partners, 2013. *Photograph* by author

Fig. 7.14 St. Alban Restaurant, London. Designed by Stiff and Trevillion, 2007

7.2.4 Decorative Lighting

This is a rather sweeping category because it can cover so many different types of installations, made even more difficult when, as I wrote in my last book, there are 18 sectors in the interior design industry. This form of lighting suggests that it is not the main lighting that facilitates work, circulation or display, but rather it is an additional form that richly enhances the space by its shape, content and effect. If it is the main illuminating source, then the designers obviously intend to emphasise its presence.

The left-hand side of Fig. 7.15 is intended to sum up the essence of 'decorative' in that it may be quite complex and contain patterns and colours on surfaces or as objects. The table lamp on the right combines new technology with traditional craftsmanship and is a sculptural object. It is characterised by a virtual fusion between marble and hand-blown glass. The materials are put together in combination with a precision only possible thanks to high-level digital technology. The glass part and the marble part are separate pieces but one is nothing without the other. They fit together through gravity alone. The glass is produced by the Venini furnace in Murano (IT) and the marble by Testi in Verona (IT).

The excellent Sunset Point House (Fig. 7.16) has a very natural, organic feel to the interior by combining browns and greys with natural materials and a steel structure. The range of lighting covers a floor standard lamp, recessed spotlights, surface mounted spotlights, and adjustable spotlights on a suspended track, as well as decorative pendant lamps over the dining table and the kitchen worktop.

Figure 7.18 consists mainly of decorative lighting ranging from pendants, wall-mounted and table-mounted fittings. The impression given to the shopper is of a congested display with each fitting competing with others making it difficult to focus on the effect of each one.

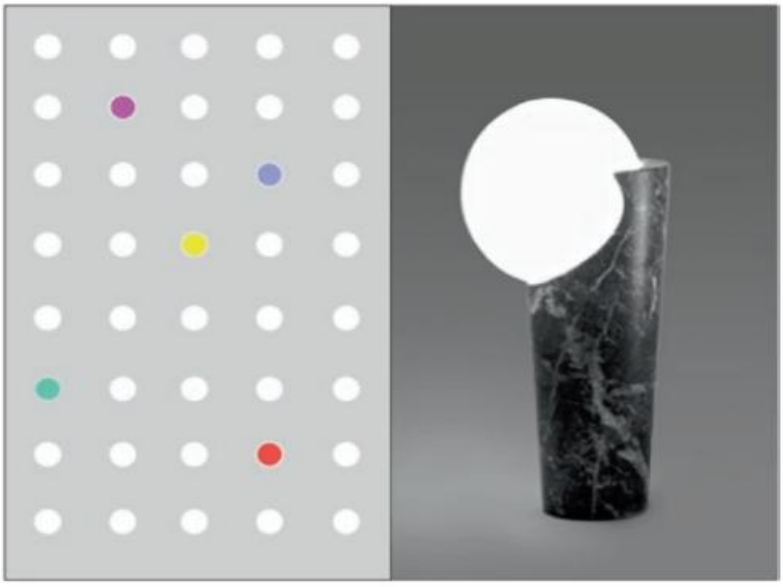

Fig. 7.15 Decorative lighting diagram and fitting designed by Emmanuel Babled, 2014

Fig. 7.16 Sunset Point House, San Juan Island, Washington. Designed by David Vandervort Architects of Seattle, 2013. *Photograph* by Michael Shopenn

Fig. 7.17 Retail lighting showing spot downlighters plus decorative pendants. *Photograph* by author

The pioneering PH artichoke pendant fitting in Fig. 7.19 which was designed in 1958 is a timeless organic design that still captivates and sells throughout the world. It is characterised by 72 leaves forming 12 rows of 6 leaves each, which are positioned to provide 360° glare-free light when viewed from any angle. They

Fig. 7.18 Typical retail sales area for all kinds of domestic lighting. *Courtesy* John Lewis. *Photograph* by author

Fig. 7.19 Artichoke pendant light. Designed by the Dane Poul Henningsen in 1958

Fig. 7.20 Flame pendant 200 cm high designed by American sculptor Bathsheba Grossman, 2014

also shield the light source, redirecting and reflecting the light onto the underlying leaves. The result is a luminous glow (Fig. 7.20).

This beautiful Flame pendant is the product of a sculptor who originally studied mathematics, which obviously equipped her with the skills necessary to conceive of such a design. It almost conveys the movement of dance. The materials used are as follows: the twisted shade elements: polyamide (nylon); and the mounting cup: stainless steel/chrome finish. The lamp is halogen 12 V GY6.35—Max 20 W. Here is what the designer has to say:

The inspiration behind the flame pendant lamp came from a sculpture, made from a slab of clay and cut into a cube. Four corners were twisted clockwise whilst the other four were twisted counterclockwise. The flame lamp is designed with this symmetry in mind, but on a much more intricate scale.

The interesting facets of light and shadow are made possible by Materialise's rapid prototyping technique. Instead of using paper and ink, digital designs are 'printed' with a laser, adding layer upon layer until a beautifully complex object is formed.

Figure 7.21 shows a suspension luminaire providing diffused lighting that almost simulates the street lamp. Its asymmetrical composition is invigorating. The use of an internally half-silvered lamp reflects the light onto the glass shades which in turn softens the reflected light into the space. The central body is die-cast aluminium with 10 blown glass cones of different sizes and a polycarbonate rose.

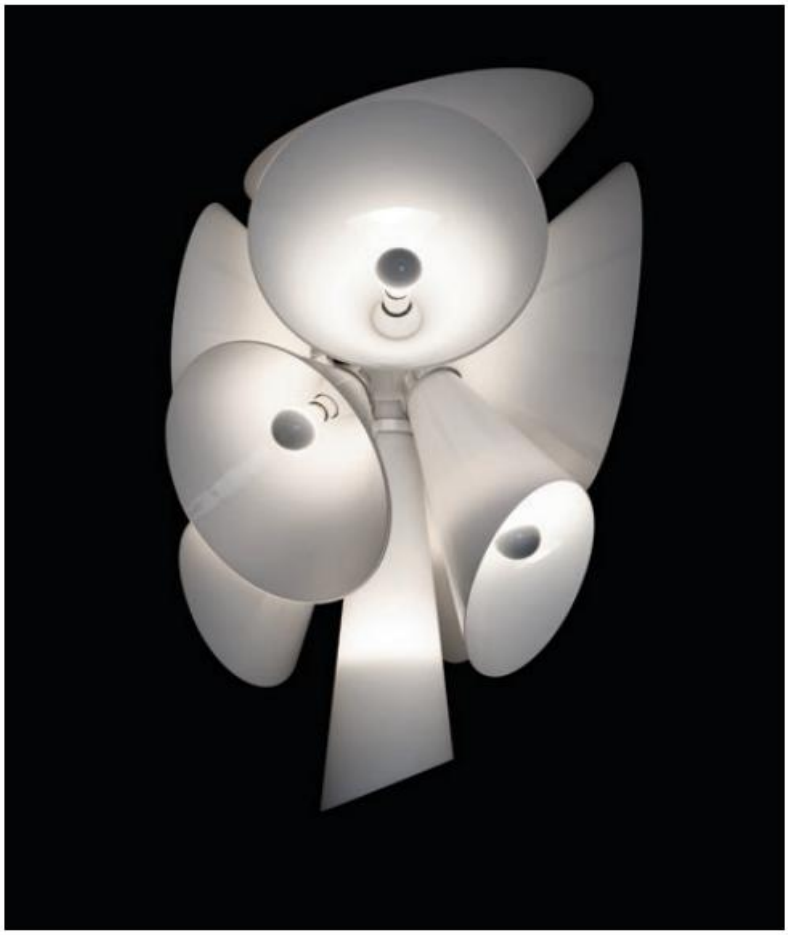

Fig. 7.21 Nebula by Flos. Designed by Joris Laarman, 2007. Aluminium and glass

Fig. 7.22 CIRC pendant by Solera Corp. Image by Eunice Rivera

Figure 7.22 shows a versatile contemporary circular pendant with opal diffusive lens provides beautiful soft and powerful glowing LED light. Comes with a variety of LED colour options such as white and RGB (red, green and blue) as well as the option of having DMX controls, this glowing interior pendant can be used in smaller spaces as well as larger open spaces such as lobbies and atriums. An exterior lens instead of the interior one pictured is also available and is called the

CIRC-O available from 24″ (610 mm) to 60″ (1524 mm) diameter. The internal lens frame is built with high-quality extruded aluminium with high-quality seamless continuous welding. The outer diffusive lenses are jointed together with a minimal seam, and all external hardware is stainless steel.

7.2.5 Illuminated Objects

We have already seen some fittings that could be described as objects in the preceding three figures, but my category here is concentrating on those objects that are designed for a prime function, which is not necessarily lighting. In these cases, the designers have extended the function to include lighting. It is a combination of sculpture and lighting as the prime function (Fig. 7.23).

The lighting sculpture in Fig. 7.24 changes colour throughout the year; the branches and leaves change colour to reflect the passing seasons—from the pinks and yellows of summer to the browns and reds of autumn. It is a wonderful celebration of nature and the name of the restaurant. It combines the disciplined arching of the steel tubular branches with the haphazard disposition of the illuminated leaves.

Figure 7.25 shows a chair that is lit up which is most unusual in that again it combines two functions of sitting and giving light. Here is a quote from the website of Studio Thesia Progetti:

Switch it on and your room will suddenly come alive with diffused uniform lighting. The scenographic effect has enormous impact; the same applies to the visual sensation perceived when friends or family members sit-down cosily on these highly unusual armchairs. They will look as though they are floating or hovering on a cloud of light. Available in two versions, with or without the light fittings; the Natevo armchair is produced with elastic mesh and available in three colors: white, black and natural with a steel structure. Light and easy to manage, this armchair comes alive with integrated light from a floor-level luminous panel; it has been tested 200,000 times.

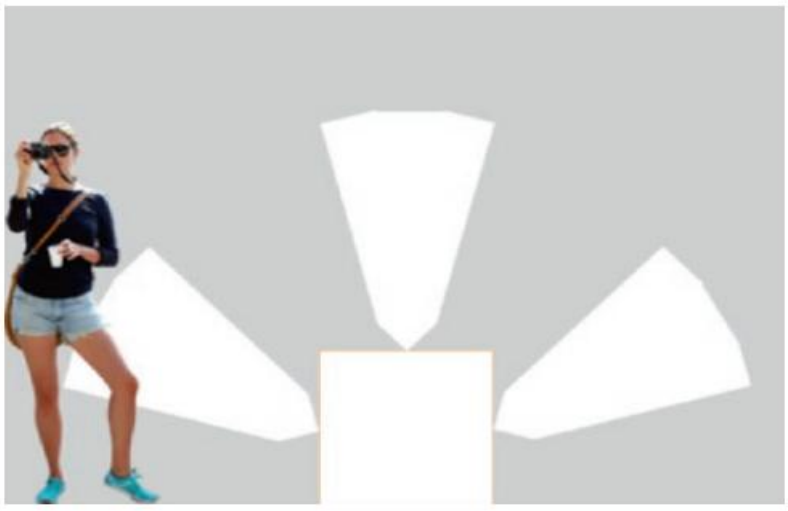

Fig. 7.23 Illuminated object diagram

Fig. 7.24 Light sculpture for Wondertrees Restaurant in Terminal 2 Heathrow Airport, London. Designed by Cinimod Studio, 2014

Fig. 7.25 Lounge chair Nuvola di Luce by Studio Thesia Progetti, 2013

Figure 7.26 shows how electroluminescent technology (a form of printed light) can create a simple flat form of light in the form of an easy-to-apply 50 × 50 cm tile system that could be used to cover entire walls. Lighting wallpaper was developed using the experience from ELON Technologies with the aim to use the electroluminescent technology on commercial applications where the light is required to be absolutely flat. This product is two-dimensional and is therefore a complete departure from the range of light sources presented to you in this book. It has not emerged because the need for a 2D decorative light panel was required, but it was led by a probing technology whereby scientists discovered an outlet for their discovery.

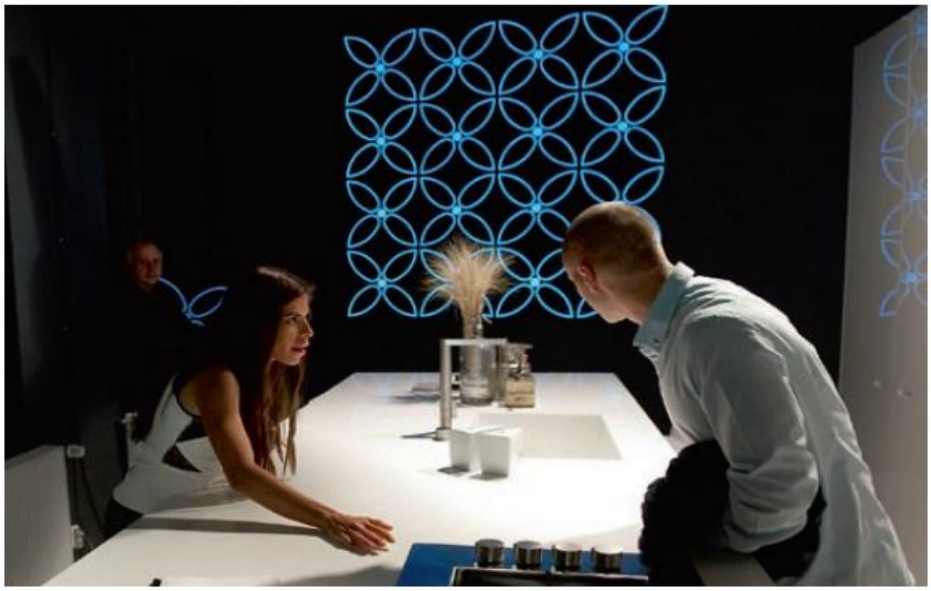

Fig. 7.26 Lighting wallpaper installation by Elon Technologies of Czech Republic exhibited at Designblok in Prague, 2014

Fig. 7.27 Bourrasque light installation by Paul Cocksedge of London, 2011. *Photograph* by Mark Cocksedge

Figure 7.27 shows another sculpture which resembles pieces of paper caught in the breeze. Installed in the courtyard of a hotel in Lyon, the 25-m-long Bourrasque sculpture was completed for the city's annual festival of lights. The 200 suspended sheets were made from an electrically conductive material that lights up when a current passes through it. Each sheet was the same size as a sheet of A3 paper and was moulded into shape by hand. You may wonder what this work has to do with interior design. Well, all art and design areas overlap in many ways and I have always welcomed any inventive product that is inspiring, beautiful and warms the

soul. This light sculpture by Cocksedge is such a piece. It is dreamlike in that it almost freezes the moment when pieces of paper are blown up by the wind. The major difference between sculpture and design is that design aims to produce a solution to a problem. The problem may already exist and be recognised, or the designer is searching to define what the problem is. The isolated artist or sculptor works from inspiration as the motivating factor and is not driven by any external force. The Wondertrees restaurant commissioned Cinimod Studio to produce a light sculpture, and in that sense, the sculptor is working within the confines of a brief and has been set a task or problem to solve.

7.3 Natural Light

One of the delights of natural light are the changes in direction, strength and colour that occur through the day and as a result of seasonal weather patterns.[5] **John Coles and Naomi House**

In this sense, the designer has enormous power to influence not only visual perception, but also the emotional and physical experience of the built environment. To be able to do this intentionally, we need to understand the patterns and qualities of light.[6] **Malcolm Innes**

Natural light, or daylight, is so much different to artificial light in that its source is the sun and therefore out of the control of the designer. How much daylight enters a building is within the power of the architect rather than the interior designer. However, the adaptation of a building does give the designer the scope, depending upon the constraints of the building, to alter and change those openings and access points, which will in turn affect the daylight entry to the building. So in my examination of this topic, I will attempt to cover those major architectural sources of daylight that designers have to acknowledge. The planning of activities involves the consideration of daylight cycle during the day and the seasons, and the orientation of the building. It is a two-way situation of daylight entry, shadows cast, and the people inside the building being able to see out. It is also a means of natural ventilation. As explained in my last book, the evolution of building began with a total solid enclosure with no daylight to a totally transparent enclosure whereby walls and roof could be glass (Fig. 7.28).

The extreme transparent box is rare, but the increased sophisticated technology of glass has persuaded designers to use it extensively. I shall examine the more

[5]John Coles and Naomi House, *The Fundamentals of Interior Architecture* (Lausanne, Switzerland, AVA Publishing, 2007) p. 122.

[6]Malcolm Innes, *Lighting for Interior Design* (London, Laurence King, 2012) p. 37.

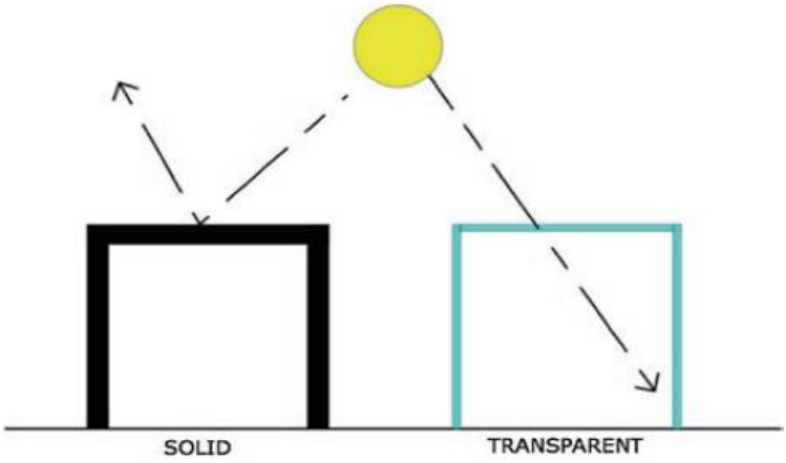

Fig. 7.28 Daylight evolution diagram—two extremes

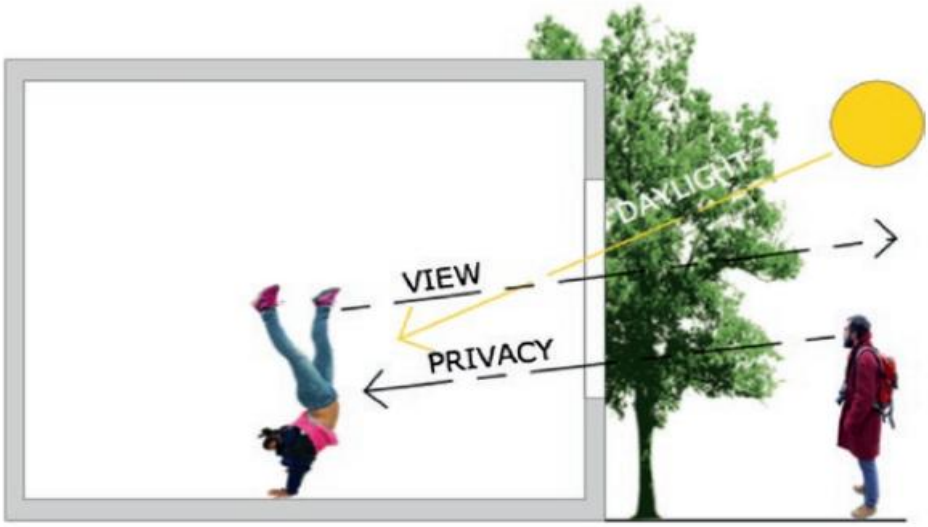

Fig. 7.29 Daylight, view, privacy diagram

common daylight entrances that designers will face, which is generally dealing with existing old building stock in terms of refurbishment and reuse:

Windows,
Glazed walls,
Rooflights,
Clerestory and
Entrances/exits.

All of the above adjustment and control of the amount of daylight and direct sunlight entering the building is desirable, as well as observing possible needs of privacy of the occupants as illustrated in Fig. 7.29.

7.3.1 Windows

The history of windows (using glass) begins with the stained glass windows of medieval cathedrals. From the fifteenth century, only small leaded clear glass about 14 × 8 cm could be produced and these were held together by cames, which were grooved bars of lead known as leaded windows. These were wired to iron standards (vertical rods) and staybars (horizontal rods) which were set, at intervals, into the window surround. Also popular were square-shaped glass panes set on the diagonal as shown in Fig. 7.31.

Gradually over the years, glass production became more sophisticated so that the panes of glass were getting bigger. The first advances in automating glass manufacturing were patented in 1848 by Henry Bessemer,[7] an English engineer, which enabled plate glass to be produced which eventually led to the production of float glass of the twentieth century. This method was invented in the 1950s by Ken Bickerstaff and

Fig. 7.30 Window diagram

[7]Sir Henry Bessemer (1813–1898) was an English engineer, inventor and businessman. Bessemer's name is chiefly known in connection with the Bessemer process for the manufacture of steel.

Fig. 7.31 Guildhall of Corpus Christi, Lavenham, Suffolk, England, sixteenth century. *Photograph* by author

Sir Alastair Pilkington.[8] Eventually, the panes of a window divided by glazing bars disappeared, making way for large windows without any divisions. The technology of increasing the size and thickness produced glass of such strength that a window became the size of an external wall as well as internal partitions from floor to ceiling. Other developments in glass technology are prevention of solar gain, reflective glass, toughened glass, wired glass and coloured or tinted glass. For example, a great way to reduce glare is to use glass with light diffusion properties. Acid-etched glass significantly scatters natural light into a much larger area of the interior space.

Design considerations for a window that designers should take on board are as follows:

- Planning, positioning,
- Relationship with artificial lighting,
- Size of opening,
- Depth of frame/reveal,
- View,
- Ventilation if required,
- Solar gain,
- Daylight adjustment—blinds, shutters, curtains,

[8]Sir Alastair Pilkington, (1920–1995) and his associate Kenneth Bickerstaff, both of Great Britain, developed the world's first commercially successful manufacture of high-quality flat glass using their float glass process.

Fig. 7.32 Georgian windows and folding internal shutters in an interior of Hill House, Wickwar, Gloucestershire, UK. *Courtesy* Stormwindows

- View of interior at night with illumination,
- External sounds—i.e. traffic and
- Safety.

I would like to add that I believe that shutters, whether internal or external, seem to have lost their popularity in the UK, as opposed to France and Germany. They can be produced in solid form or louvred. They not only offer lighting adjustment but can also provide security. The internal Georgian shutter, seen here in Fig. 7.32, which folded away into a recess so as to be concealed, was a superb way of offering security without imposing its presence onto the interior.

7.3.2 Glazed Walls

The house by architect Mario Botta[9] in Figs. 7.33 and 7.34 has two sliding glass walls with diagonal framing that occupies the circular opening. They slide back completely into the thickness of the external brick walls. This exposes the internal living space to the outside in such a way that the existence of the window is

[9]Mario Botta (born 1943) is a Swiss architect. His designs tend to include a strong sense of geometry, often being based on very simple shapes, yet creating unique volumes of space.

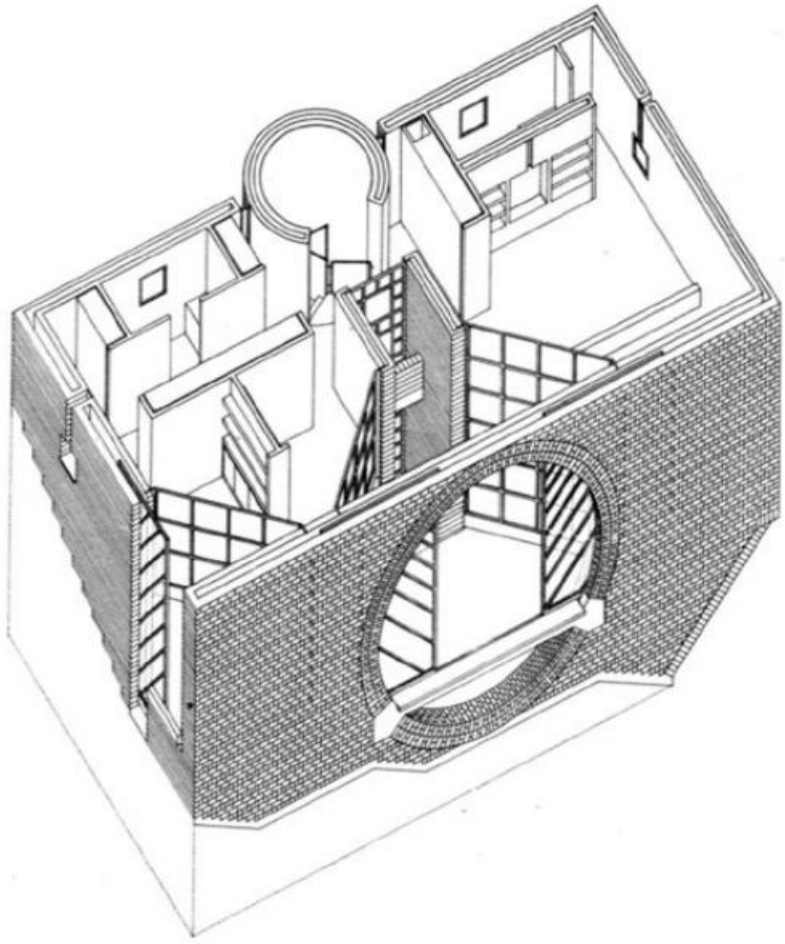

Fig. 7.33 Axonometric of the Casa a Massagno, Switzerland. *Architect* Mario Botta, 1979

Fig. 7.34 Casa a Massagno with glazed wall open on *left* and closed on *right*. *Photograph* by Alo Zanetta

Fig. 7.35 Exterior of The Chapel of St. Albert, the Great showing the front entrance, George Sq, Edinburgh, Scotland. *Architects* Simpson and Brown, 2012. *Photograph* by Chris Humphreys

Fig. 7.36 The interadapted Serpentine Sackler Gallery exterior, London, by Zaha Hadid Architects, 2013

Fig. 7.37 First floor bedroom of Belvedere House, Florida, USA, by Shulman and Associates, 2010. *Photograph* by Robin Hill ©

concealed and a strong union of outside to inside is made. A brilliant solution as is the general detailing of the building.

The chapel in Fig. 7.35 has part glass exterior walls and part stone. The glass has been used to maximise daylight entering through the entrance whilst at the same time providing lightness to the structure as if floating unattached. Similarly, with the Serpentine Sackler Gallery in Fig. 7.36, the curved structure is seemingly floating. The glass walls appear frameless and are partly curved to match the organic nature of the roof. Curved glass gives distortion in reflection.

Figure 7.37 is another example of a glass wall that opens out onto balconies.

7.3.3 Rooflights

Rooflights are designed to provide daylight into a space from the ceiling/roof level. The Great Court in Fig. 7.38 is a superb space that used to be an open wasteland between the circular reading room and the main building of the museum. This infill has created one of the most magnificent urban renewal types of space I have ever witnessed. Having walked through the neoclassical building with its fine displays of antiquity, you suddenly feel this amazing glow of natural light through one of the many new introductory stone-framed entrances around the perimeter of the Court. Then, bursting into the main arena is a totally uplifting experience mainly because it is so inviting, but secondly, it takes your breath away for

Fig. 7.38 Great Court, British Museum, London. *Architect* Foster and Partners, 2002. *Photograph* by author

its surprise factor. The unique geometry of the roof forms both the primary structure and the framing for the glazing, which is designed to reduce solar gain and is about 100 mm thick. The fine steel lattice is constructed from custom-made steel box beams joined at six-way nodes. The roof's toroidal framing was defined using a customised form-generating computer programme. The roof shape is curved to a tight radius of approximately 165 ft (50 m), which means it can act much like a dome, whilst imposing minimal loads onto the existing surrounding structures. The new roof over the Court was designed by Foster and Partners, architects, and Buro Happold, engineers, and was fabricated and erected by Waagner Biro. It is composed of 3312 individual panels of glass, each one a unique triangle. The 3312 panels of glass are screen printed with small dots on 50 % of their surface—a technique called 'fritting'. The fritting filters ultraviolet rays and reduces solar gain.

The Great Court is a most unusual example in that it is an architectural masterpiece, which is more than can be said for many buildings that have rooflights. Many common installations are an eyesore when viewed externally, but in many cases, this view may be obscured and because the effect of the daylight entering the interior

Fig. 7.39 Interior of the Pantheon, Rome, Italy, showing the coffered concrete dome. 126 AD. *Photograph* by Richijheath of Wikimedia Commons

space is so delightful for the owners/users they accept it. Interior designers can be faced with a project that demands either existing rooflights that may need altering or improving or that rooflights are a totally new addition to the building's structure. Having been given a building with a solid roof that was not designed to have rooflights, the idea of inserting them requires great ingenuity and sensitivity to the existing building's character. How many times have we witnessed existing roofs and rooflines botched by the insertion of rooflights, dormer windows and currently, solar panels for heating water? Building elevations are easily seen by people, but roofs are only seen fully by people in aeroplanes or neighbouring high-rise buildings.

The most famous early rooflight (or skylight as is sometimes called) in history must be the one at the oculus of the Pantheon in Rome seen here in Fig. 7.39, except that in this case, it is open to the sky with no glass covering at all. It is remarkable how much reflected light there is for such a large space. The diameter of the plan is 43.3 m which is exactly the same as the height from floor level to the oculus. The oculus itself is 8.3 m in diameter and serves as a cooling and ventilation method. During storms, a drainage system below the floor handles the rain that falls through the oculus.

7.3.3.1 Design Considerations for a Rooflight

A rooflight allows natural light to enter the interior space from above (Fig. 7.40). It is not designed for people to look out and therefore has a one-way function. From the point of view of daylight entry, the rooflight is far more efficient than the window in this illustration with its even spread of light.

Figure 7.41 shows how effective and even the spread of light is in this workspace.

Atrium spaces, such as the one illustrated in Fig. 7.42, are by definition a void in the centre of a multi-storey building with a rooflight over. This shopping centre survives mainly by the sparkle of the retail shop units, and the central space lit up by daylight, which is a good fusion of the two sources of light. One does not conflict with the other.

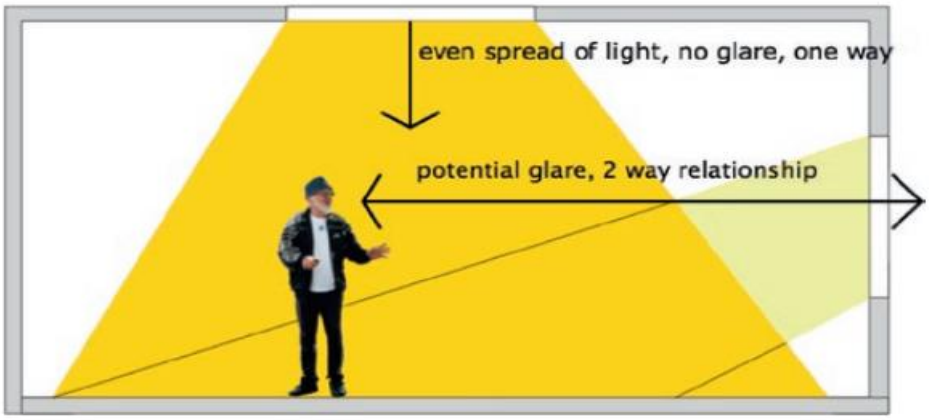

Fig. 7.40 Window/rooflight relationship diagram

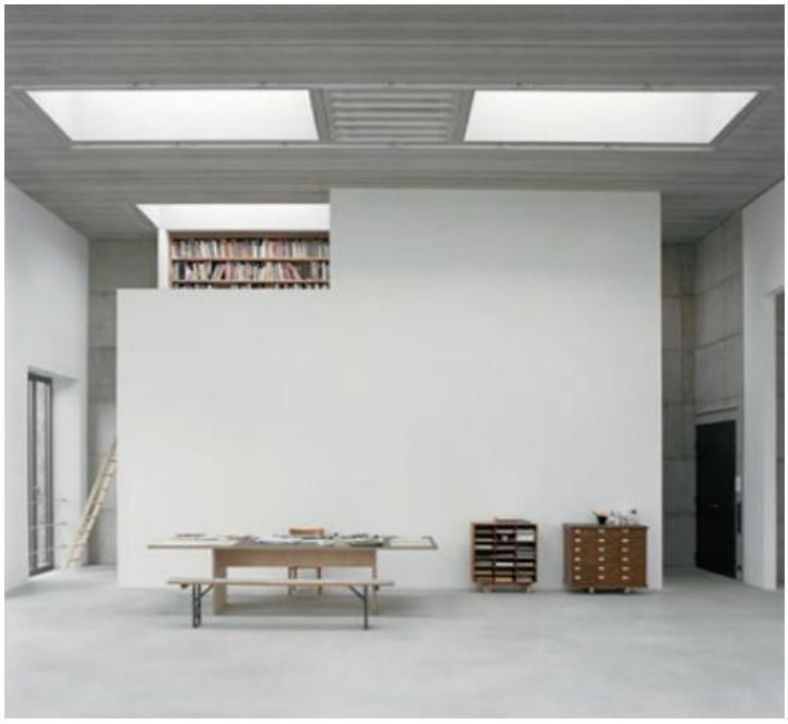

Fig. 7.41 Rooflights in own offices in Berlin, Germany. Designed by Sauerbruch Hutton architects, 2009. *Photograph* by Annette Kisling. Studio Karin Sander, Berlin

Fig. 7.42 Bentalls Shopping Centre, Kingston, Surrey, UK. Designed by BDP architects in 1994. *Photograph* by Andy Borzyskowski

But rooflights have a limited field of application in interiors, as they can only be installed (in existing buildings) or designed for new buildings in the following situations:

- Top floor of a building,
- Single-storey building,
- Every floor of a zigguratical building,
- Atrium or courtyard and
- Pavement lights for basements.

The requirement to use them to ventilate the interior can vary depending upon the needs of the interior. If they are the sole daylight entry point into the interior, then they would have to be openable.

7.3.4 Clerestory Window

Historically, a clerestory window appeared in the upper wall levels of Roman basilicas, Egyptian temples, or in churches of the Middle Ages. It is basically, a way of admitting daylight through a vertical wall above door height (see Figs. 7.43 and 7.44). The Surfrider Project in Chap. 5 shows both rooflights and clerestory windows. It is also ideal regarding privacy if it obviates the need to have windows at eye level.

Fig. 7.43 Ely Cathedral exterior. Founded 673 and built from eleventh century. *Photograph* by author

Fig. 7.44 Ely Cathedral interior of nave. *Photograph* by author

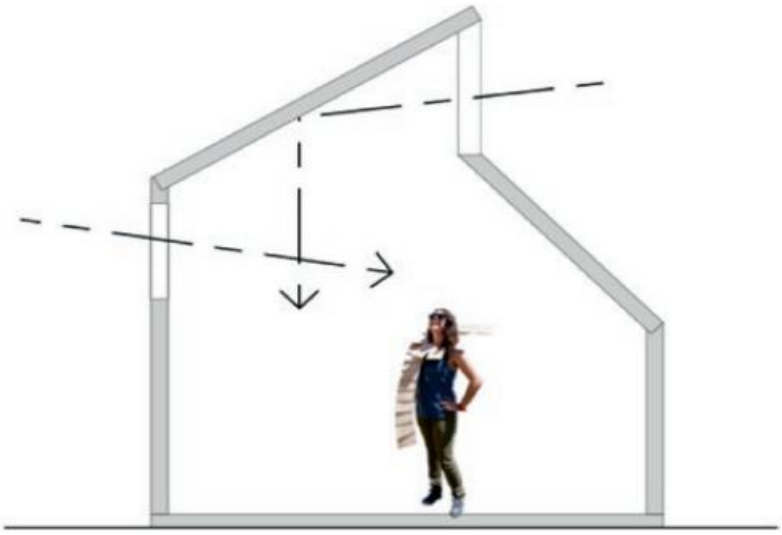

Fig. 7.45 Clerestory window diagram showing daylight entry

Figure 7.45 shows the most common locations for clerestory windows. Without any eye-level windows, the emphasis, in daytime hours, is on a brightness from above which could be good for studio/workshop-type activities where concentrated effort is required undisturbed by the external environment. Figure 7.46 shows how effective this form of daylighting can be.

Fig. 7.46 Clerestory window. Lounge of Washington Park residence, Seattle, USA. Designed by Conard Romano Architects. *Courtesy* Architects. *Photograph* by Aaron Leitz

7.3.5 Entrances and Exits

An entrance that is designed to admit daylight is forfeiting a higher degree of safety than one that is solid. With technological improvements to the strength of glass, this has become a low priority. Figure 7.47 shows how the size of the glazed entrance affects how much daylight enters the building. The prime reason for an entrance to a building is to gain access. Historically, all entrance doors were solid and they did not allow daylight into the building. As the entrance was considered

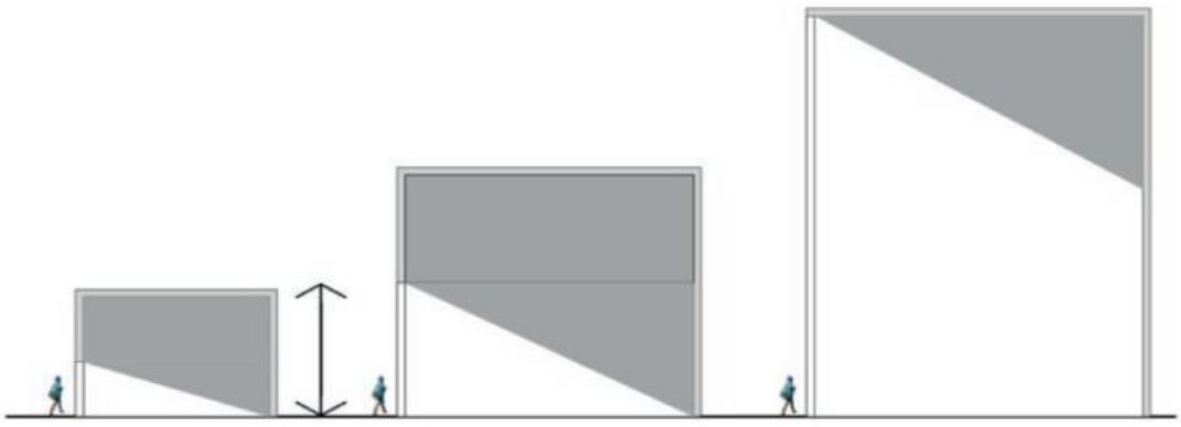

Fig. 7.47 Daylight entrance diagram

to be the weakest point of defence from invaders, a glazed opening was not on the agenda. It was not until Tudor times that glass appeared either by the side of the window or as a fanlight above the door as can be seen in Fig. 7.48, and in later periods Figs. 7.49 and 7.50.

Fig. 7.48 Entrance door to Blickling Hall, Norfolk, England, fifteenth century. Drawn by author

Fig. 7.49 Art Nouveau door. *Photograph* by author

Fig. 7.50 48 Merrion Square East, Dublin. Eighteenth century. *Photograph* by Noel Clarke

From the images above, it can be seen how gradual daylight entry had become a desirable element. In the earlier periods, some of the entrance halls would have been gloomy places, so the introduction of daylight would have lightened the atmosphere. The side windows in Fig. 7.50 enabled the resident to view any caller at the door. If we wind forward to the present day, we can see in Fig. 7.51 that new technology and design has swept away all vestiges of the past. It shows a modern house with the ground floor glass walls lit up from the inside. Three bays to the left open up into a garage, and the last bay to the right is the main entrance into the house.

Fig. 7.51 House in Kyoto, Japan. Designed by Alphaville architects, 2010. *Photograph* by Kei Sugino, Kentaro Takeguchi

7.4 Summary Diagram

I hope the reader is now in a clearer position to know what has to be handled in order for a lighting concept to be formulated. The following diagram summarises what this chapter has tried to do (Fig. 7.52).

Whatever forms of lighting are chosen, it is important that the designer's selection amounts to a singular scheme without any conflicts between the various sources.

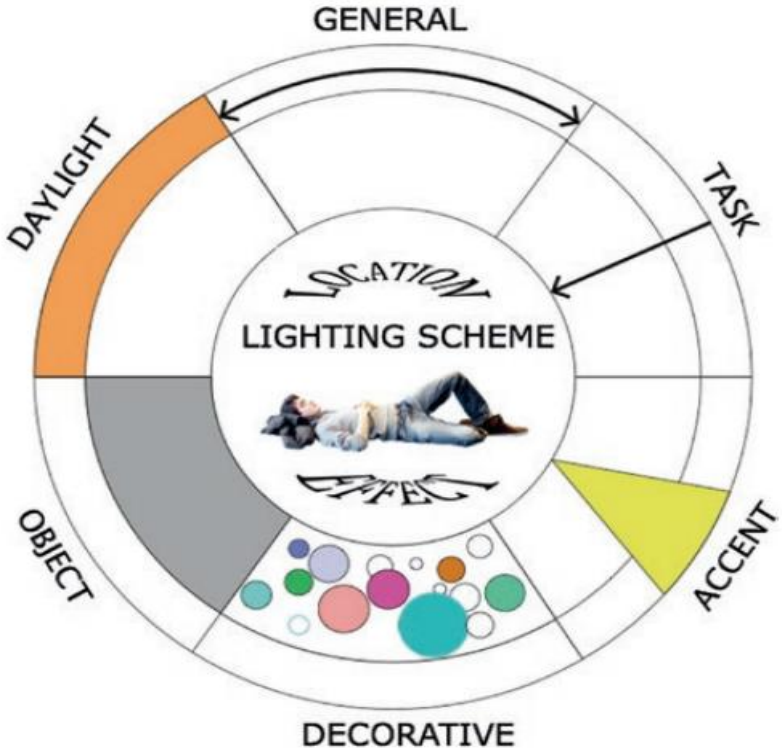

Fig. 7.52 Summary lighting diagram

Conclusion

Statement

My purpose in writing this book was to expand on that part of the design process defined as conceptual thinking, which gives birth to the ideas inherent in a design scheme. I am hopeful that readers will gain further insight into this important generative stage in designing, and that their future work will have more body and substance than they have hitherto experienced. There are many books as I have referred to in my text that are excellent in their coverage of the field of interior design, design theory, geometry and the human form, but I have always found something lacking in explaining where the creative spark comes from. Of course some designers may say that they had a 'eureka' moment whilst climbing a mountain, or driving long distance, or just falling off to sleep. This fortuitous and unplanned occurrence is not something that can be relied upon if there are deadlines involved. So in breaking up the process of conceptualising into the seven categories as outlined in this book, I have been pleased about how this kind of analytical thinking has been pertinent to this difficult field of interior design.

Example

I now find it necessary to provide an example of how the formation of such an analysis that is about expressing the nature of the job can work to produce a final concept for an interior, or in this case a shopfront (Fig. 1).

If we take the task of designing the front of a dual gender shoe shop, which should relate to the interior, I would suggest the following as an example of how conceptual thinking can work. This is accepting that there would be client input as to identity and so on, but I am just focussing on the word 'Shoe'. An analysis is made of a variety of shoes, their form, shape, materials and function. From this I recommend that designers make this a starting point in forming strong connections

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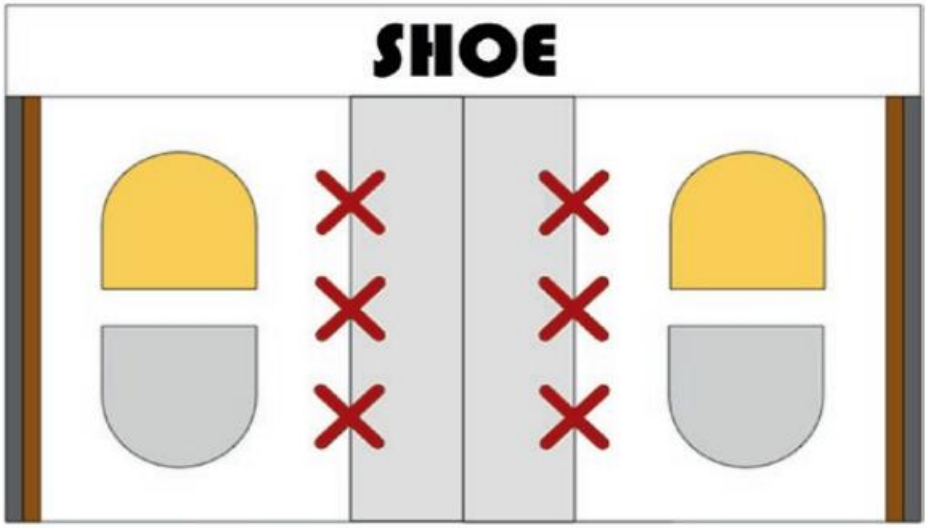

Fig. 1 Front elevation of a proposed shoe shop

with the subject matter. I have found that the more successful design solutions are those that have these connections, as compared with designs that have forms, shapes and colours but with no meaningful links with the subject matter.

1 The geometry is simply divided up as follows:

- Fascia defined on client instruction to have the name—SHOE.
- Remainder taken up with central doors and window areas on a symmetrical basis as exists with a 'pair'of shoes.
- Grid lines in Fig. 2 showing main axis.

2 Visual connection to a SHOE as a design source is made as follows:

- Brown/grey vertical edges taken for the sole of a shoe.
- Crossed hinges (6 nos) of glass doors taken from shoe laces.
- Arched windows taken from the heel of a shoe.

The following is the list of Concepts involved in the above accepting that the interior would be integrated with the frontage:

PLANNING—The composition of the elevation is a planning exercise.
CIRCULATION—People access will be via doors. Potential customers will view display or the interior through the window areas.
3D—Although the elevation is more 2D than 3D there are however visual links to be made to the interior design. The design could be in relief with doors and windows set back for example, resulting in reveals to both.
CONSTRUCTION—This is all about framing: the fascia, the windows, the doors and the vertical edges. The hinged mechanism is expressed through the crossed laces. Choice also governed by security.
MATERIALS—Consideration of weatherproof surfaces and glass.

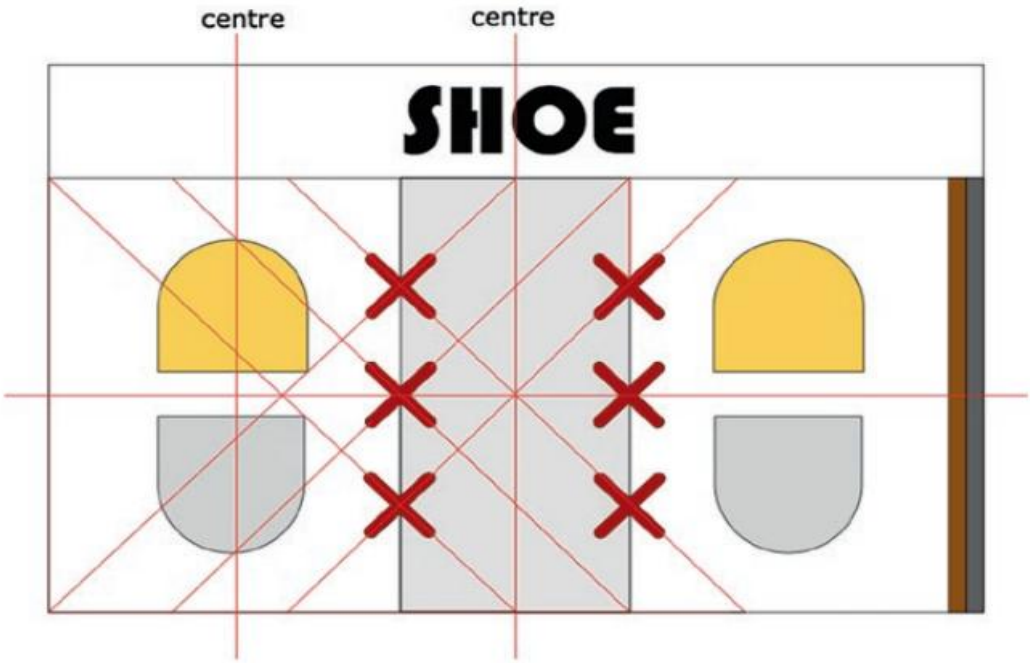

Fig. 2 Elevation showing geometric structure giving the basis of the design

COLOUR—The colours should be integral with tough materials allied to the toughness that shoes have to be to withstand the wear and tear.

LIGHT—Illumination is critical in retail design for the frontage as well as for the interior displays. The brand name needs to be seen as well as providing glimpses of the interior.

Appendix

Professional and Educational Organisations

Professional Bodies

CSD—Chartered Society of Designers—UK
The Chartered Society of Designers (CSD) is the professional body for designers and the authority on professional design practice.It is the world's largest chartered body of professional designers with members in 33 countries and is unique in representing designers in all disciplines. The Society exists to promote concern for the sound principles of design in all areas in which design considerations apply, to further design practice and encourage the study of design techniques for the benefit of the community. In so doing, it seeks to secure and promote a professional body of designers and regulate and control their practice for the benefit of industry and the public.

BIID
The British Institute of Interior Design is the pre-eminent professional organisation for interior designers in the UK. Our growing national and international membership represents both the commercial and residential sectors, from heritage to cutting edge. In addition to rigorous entry requirements which assess training, experience and professionalism, we require our members to continue their professional development throughout their career to ensure their continued expertise in design process, practice and regulatory matters. TheBritish Institute of Interior Designis the only professional organisation for interior designers, which has been granted the prestigious and rare accolade of Institute status by the Minister of State as the pre-eminent body in its field.

SBID
The Societyof British and International Design (SBID)is the national representative organisation to the European Council of Interior Design and Architecture. We create and measure the professions trading standards through practice, knowledge

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and science. We steer and protect our members in business to increase their profile, protect and promote their reputation and create opportunities.

IFI—International Federation of Interior Architects/Designers
The profession provides leadership and utilizes an iterative and interactive process that includes discovery, translation and validation, producing measurable outcomes and improvements in interior spaces and in the lives of the people who use them.

IIDA (International Interior Design Association)—USA, *with respect for past accomplishments of Interior Design leaders, strives to create a strong niche for the most talented and visionary Interior Design professionals, to elevate the profession to the level it warrants, and to lead the way for the next generation of Interior Design innovators. The Association provides a forum to demonstrate design professionals' impact on the health, safety, well being and virtual soul of the public, balancing passion for good design and strategy for best business practices. IIDA stands at the intersection of passion and strategy where designers create extraordinary interiors and experiences.*

IDA (Interior Design Association)—UK
The IDA was established in 2009, when it became clear that no industry body satisfactorily represented interior design practices and individuals in the commercial market place.

It is an independent body for the interior design industry and has the objective to facilitate a strong and prosperous contract interiors market. The development of members' commercial interests is a priority and raising the status of the interior designer its key objective.

ECIA—European Council of Interior Architects
The ECIA is the representative body for the European professional organizations in Interior Architecture and Design. Founded in 1992, ECIA currently represents 16 members-national organizations, with over 7500 practicing Interior Architects. ECIA provides a common platform for the exchange of information on best professional practices and has established common minimum standards of educational and professional profile for the Associated Interior Architects in the member organizations. ECIA is the common voice of Interior Architects on European and international level, promoting this profession as vital part of society and economy.

BEDA—Bureau of European Design Asssociations
BEDA exists to ensure permanent liaison between its Members and the authorities of the European Union in order to communicate and promote the value of design and innovation to the European economy. Founded in 1969 BEDA boasts 46 members from 24 member states in Europe. Members can be design promotion centers and other publicly funded organisations that promote design nationally or regionally as well as professional and trade associations for designers from across Europe. Those professional associations represent some 400,000 designers from across Europe in every discipline of work from industrial design and interiors to digital design and branding. BEDA is a not-for-profit organisation funded in its entirety by its members.

DBA Design Business Association—UK
The Design Business Association exists to promote professional excellence through productive partnerships between commerce and the design industry to champion effective design which improves the quality of people's lives.

Educational Bodies

CIDA (Council for Interior Design Accreditation, in USA) 2011
The responsibilities of the interior designer encompass all spaces within environments built for human habitation. Educational philosophies and goals should be applied in the development of a creative professional who can analyze problems from many different perspectives and synthesize information.

NCIDQ—National Council for Interior Design Qualifications, USA
The interior design process follows a systematic and coordinated methodology, including research, analysis and integration of knowledge into the creative process, whereby the needs and resources of the client are satisfied to produce an interior space that fulfills the project goals. The NCIDQ Examination consists of two multiple-choice sections and a drawing practicum entirely focused on health, safety and welfare. While interior designers must possess knowledge in many areas, such as accounting, human resources and aesthetics, the NCIDQ Examination tests knowledge in only those areas that relate to health, safety and welfare.

Interior Educators (IE 20-04-2010) UK
Interior Educators (IE) is a new organisation established by academics representing well-established Interior design/interior architecture courses from across the UK. It is a unique group in that it provides a forum for debate and the exchange of ideas and practice effecting the education of designers of interior space. It is currently the only relevant and influential mouthpiece for interiors education and educators in the UK. At the present time it meets formally twice each year.

Its overarching objectives are:

- *To promote the interests of Interiors education.*
- *To provide a coherent, collective and representative body through which to articulate current and future common issues and ambitions.*
- *To actively liaise with any other organisations that concern themselves with interiors education or have interests in associated areas of work.*
- *To influence and inform current thinking and research via the collection and dissemination of information concerning interiors education.*

Education

IE will represent the interests of Interiors education through:

- *the promotion and recognition of excellence and intellectual rigour within the broad range of UK wide Interior Architecture and Design education and research.*

- *the advocacy for all affiliated undergraduate and postgraduate degree programmes in Interior Architecture and Design subjects and support the diversity and range of that provision.*
- *recognition as the national authority on UK Interior Architecture and Design education and research issues. IE will provide a mechanism for the recognition of excellence through publication, citation and research outputs, and for the collective promotion of affiliated programmes.*
- *contributing representative views too wider environmental / educational debates and forum including CHEAD, CUMULUS, AHRC funding, and research studentships.*
- *coordinating and sharing good practice, external examiners and other subject specialists.*

I founded the forerunner of this in Nottingham 1983 which was the AIDDC (Association of Interior Design Degree Courses in the UK).

IDEC—(Interior Design Educators Council) USA
The mission of The Interior Design Educators Council, Inc. is the advancement of interior design education, scholarship, and service.

IDEC will be recognized as the leading association and authority on interior design education by:

- *Advancing responsible design thinking through education, scholarship, and service.*

Advancing the interior design profession's Body of Knowledge. (A profession's body of knowledge is the abstract knowledge needed by practitioners to perform the profession's work. Abstract knowledge is what an interior design practitioner knows and applies to a design project. This is not to be confused with the skills designers need to practice or tasks designers are required to perform.)

- *Participating in leadership discussions and actions that affect the entire design community.*
- *Being the primary source of innovative interior design teaching resources.*
- *Being the leading venue for the publication, presentation, and dissemination of interior design scholarship.*
- *Preparing members for leadership roles in their academic institutions, communities, and the interior design profession at large.*
- *Providing support for the professional development of interior design educators at all professional levels.*
- *Engaging interior design educators in service to the organization and to the greater community.*

Core Values

- *We believe in the value of an accredited, formalized interior design education.*
- *We believe the preparation of an interior designer includes learning through formalized education, scholarship, and service.*
- *We believe the foundation of interior design education is grounded in ethics and encompasses environmental, cultural, social, global issues.*

- *We believe in an open dialogue and collaboration among colleagues.*
- *We believe a successful interior design education depends upon the participation of diverse groups of people.*

ECIA European Charter of Interior Architecture Training
ECIA provides the foundation for excellence in the interior architecture profession by setting standards for education and training.ECIA now introduces a recognition program for courses in Interior Architecture/Design and an educational membership for recognized institutions. With this program ECIA aims to further the quality of professional education in Interior Architecture/Design in Europe and enhance the exchange of people, services and knowledge. ECIA Recognition offers schools a quality seal that endorses students, faculty and alumni. ECIA Educational Membership provides a platform for the exchange of best practices, harmonization of standards, coordination of research projects and educational and professional development.

Index

0–9
3D concept, 56
3D planning, 28

A
Abedian School of Architecture, 165, 193
Abercrombie, Stanley, xx, 21
Accent lighting, 193
ACXT architects, 60
Adam, Robert, 29, 80
Adam, William, 80
Aihofanz, 194
Alphaville Architects, 97, 132, 175, 222
Alts Design Office, 77
Ando, Tadao, 136, 145, 149
And viceversa, 161
Ano, Daici, 87
Archant, 136
Archery Hall and Boxing Club, 134
Architectural Studio, Melbourne, 121
Architekten Wannenmacher + Möeller, 99
Ardmore Park, 24
Artceram, 166
Art Deco study, 84
Artichoke pendant, 198
Artificial light, 186
Artificial materials, 142
Art Nouveau, 135
Art Nouveau door, 220
Arts and Crafts, 135
Arts Council Regional Offices, 118
Ashcroft, Roland, 102, 149
Ashton Raggatt Mcdougall, 95
Asia Museum of Modern Art, Taiwan, 136
Atelier van Wengerden, 111
Aumbry, 79
Azeri Culture, 88

B
Baan, Iwan, 89, 190
Babled, Emmanuel, 197
Baille Scott, MH, 82
Barber, Edward, 154
Bass, Saul, 177
Bathroom/Sanitary Equipment, 165
Bauche, Stéphane, 44, 150
Baudot, François, xix
Bauhaus, 99, 135
BDP Architects, 49, 216
Beds, 163
Bell, Victoria, 141
Belvedere House, 212
Ben van Berkel, 24, 180
Bentalls Shopping Centre, 49, 216
Bernath, Roland, 30
Bessemer, Henry, 207
Bickerstaff, Ken, 207
Bilbao Arena and Sports Centre, 59
Birkbeck Centre for Film and Visual Media Research, 97, 183, 184
Blackwell House, 83
Blend of colours, 178
Blickling Hall, 220
Blockwork partitions, 112

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Blom, Jos, 66
Bloomer and Moore, 54
Boardman, Brett, 64
Bond University, 192
Borzyskowski, Andy, 49, 216
Botta, Mario, 209
Bourrasque light installation, 204
Brandwijk, Yvonne, 111
British Institute of Interior Design, 231
Broadbent, Geoffrey, 4, 8
Brooker, Graeme, xxii
Bruér, David, 32
Bubble diagrams, 3
Bui, Vanessa, 32
Bureau of European Design Associations, 232
Burghley House, 80

C

Cabinets, 162
Camper Shoe Store, 87
Canetty-Clarke, Sim, 178
Casa a Massagno, Switzerland, 210
Cast form, 147
Casabella Co., 162
Cazzulo, Fabrizio, 161
Ceiling Tiles UK, 192
Chac seat, 30
Chair, 124
Chan, Benny, 152, 182
Channel 4 Office, 51
Chapel of St Albert the Great, Edinburgh, 59, 211
Chartered Society of Designers, 231
Chartres Cathedral, 76
Cheng, Jeffrey, 25
Chests, 162
Chia, Jenlin, 178
China Steel Corporation HQ, 25
Choiselat, Mathieu, 45
Church and Convent of San Francisco, 175
Cinimod Studio, 203, 205
CIRC Pendant, 201
Circle, 61, 63
Circulation Concept, 38
Circulation planning, 38, 44
Clarke, Noel, 221
Clay, Robert, 170
Clerestory window, 217
Clerkenwell Design Week, 154
Coatings and cladding, 107
Cocksedge, Mark, 205
Cocksedge, Paul, 204
Coles, John, xxi, xxvi, 140, 205
Colour applied, 172
Colour concept, 170
Colour integral, 172
Colour location, 179
Colour selection, 174
Compositional emphasis, 177
Conard Romano, 219
Concept progression, 34
Concrete, 147
Constantini, Giovanni, 163
Construction choices, 108
Construction concept, 102
Cook Robotham Architectural Bureau, 165, 193
Corbusier, Le, 2, 149
Corian, 142
Council for Interior Design Accreditation, 233
Crystal Bridges Museum, 40
Crystal Palace, 134
Cupboards, 162
Curved form, 146
Cys, Joanne, xx

D

Da Fen Village art gallery, 194
DallAcqua, Fernando, 175
Day, Robin, 142
Daylight evolution, 206
Deconstructivism, 88, 99
Decorative lighting, 188
Dedon, 20
Designblok Prague, 204
Design Business Association, 233
DesignInc, 14, 189
Designyouedit, 34
Desking, 160
Desnahemisfera, 166
Didomestic apartment, 120
Dining layout, 10, 12
Directional corridor, 45
Dog-house sofa, 85
Domestic fitted wall units, 86
Domus, 154
Door opening, 12
Drawing, 14
Dubuisson, Emile, 192
Dupont, 144
Dupouy, Damien, 44, 150

E

Eastern Daily Press, 136
Ecomalta, 157
Edgecliff Medical Centre, 64
Edwards, Clive, xxi, 98

Eisenman, Peter, 92
Elevator, 48, 50
Elii Architects, 119
Elon Technologies, 203
Ely Cathedral, UK, 217
Enclosure, 144
Enclosure and journey, 18
Entrances/exits, 219
Environmental Grantmakers, 62, 192
EOOS, 20
Espinosa, Barrientos, 60
European Charter of Interior Architecture Training, 235
European Council of Interior Architects, 232
European Furniture Group, 32
Eustace, Jasper, 66
Exocet, 125

F
Family of forms, 61
Farnsworth House, 135
Fine Iron, 50, 131
Finotti, Leonardo, 189
Fixings, 108, 110
Flame pendant, 200
Floorscape, 180
Flos, 201
Fogo Island Inn, Newfoundland, 180
Folded House, Osaka, 175
Fondazione Renzo Piano, 94
Forgefix UK, 110
Fos Designers, 184
Foster and Partners, 196, 213
Fraaiheid Architects, 122
Fradkin, Alex, 180
Frame and panel, 147
Framework, 106
Franzina, Michele, 34
FT Architects, 134
Fuksas, Massimiliano and Doriana, 148, 189
Fuller, Buckminster, 152
Fusillo, 161

G
Gaia workspace, 32
Gardera-D, 44, 150
Gehry, Frank, 76, 145
General lighting, 188
Geometry, 2, 61
Georgian window, 209
Gippsland Water Factory, 14, 189
Glass, 136
Glazed walls, 209
Glendower House, 31, 43, 112, 128, 162
Google office, 157
Grand Resort Bad Ragaz, 30
Great Court, British Museum, London, 213
Great Exhibition 1851, 134
Green Edge House, 100
Grids, 17
Grossman, Bathsheba, 200
Grotto Sauna, 90
GRP, 147
Guerin and Martin, xx
Guildhall of Corpus Christi, Lavenham, 208
Guzmán, Miguel de, 119
Gyeongju Arts Center, 155

H
Hadid, Zaha, 76, 88, 147, 190
Hagia Sophia, 75
Handrails, Railings, Balustrades, 164
Happold, Buro, 213
Hayes, Luke, 91, 147
Hazukashi House, 77, 78
Height lines, 28
Helical staircase, 49, 130
Helix, 130
Hemispherical dome, 145
Henn, 19
Henningsen, Poul, 199
Heydar Aliyev Centre, 88, 89, 144, 190
Hill House, Wickwar, 209
Hille, S & Co, 142
Hill, Robin, 212
Hotson, David, 65
House, Naomi, xxi, xxvi, 140, 205
Hufton and Crow, 89
Humphreys, Chris, 59, 211
Hunstanton School, 135
Hunt, Anthony, 145

I
Identity, 59
Illuminated objects, 188
Incline, 48
Innes, Malcolm, 205
Integrated Interior, 75
Interadapt, 105
i29 Interior Architects, 46
Interior Design Association, 232
Interior Design Educators Council, 234
Interior Educators, 233
Interior form, 78

International Federation of Interior Designers, 232
International Interior Design Association, 232
Intrusive corner, 70–74
Irving, P & Sons, 141

J
Jacobsen, Arne, 103
Jiřičná, Eva, 145
Junctions, 67

K
Katos, Christina, 86
Kellerman, Gerhardt, 124, 125
Kennedy, Simon, 118
Khan, Louis, 149
Kilmer and Kilmer, 158, 170, 186
Kisling, Annette, 215
Klab Architecture, 34, 195
Klingenberg, Ellen, xxi
Knobloch, Malgorzata, 159
Kokkinias, Panos, 35, 195
Koolhas, Rem, 92
Krassa, Afroditi, 178
Kristalia Plana stacking chair, 143
Kumeko, 158
Kurtich and Eakin, xxi, 175

L
Laarman, Joris, 201
Labrinopoulos, Konstaninos, 34, 195
Lakeland Arts, 82, 83
Laminate, 142
Lara, Mauricio, 30
Layers, 20
Leathead, Stephane, 125
Leitz, Aaron, 219
Libeskind, Daniel, 88
Light sculpture, 205
Lighting concept, 186
Lighting wallpaper, 203
London underground train, 46
Lucidi Pevere studio, 143

M
Macaulay and Sinclair, 173
Mackintosh, C.R., 103
Mallah, Oliver, 153
Malnar and Vodvarka, xvii, 18, 140, 170, 187
mA-style Architects, 100
Material concept, 140
Matisse Beach Club, Perth, 178
ME Hotel, London, 196
Mechanics of Operation (MOO), 114
Meeting of planes, 68
Mellerstain House, 80
MERO-TSK, 90
Merrion Square, Dublin, 221
Metropolis Recording Studios, 95
Michigan, University of, 142
Mies van der Rohe, 135
Millennium Theatre, Cardiff, 87
Minimalism, 98
Min n mun, 85
Monroe, Marilyn, 183
Mosque at Isfahan, 75
Motacilla, 79
Moxon Architects, 118
Murray, Don, 153
Mutina Ceramics, 154

N
Nakamura, Kai, 175
National Centre for Science and Technology, 94
National Council for Interior Design Qualifications, 233
National Gallery, London, 194
National Museum Café, Canberra, 95, 96
Natural light, 187, 205
Natural materials, 141
Nebula light fitting, 201
Nest Co., 143
Netzler, Johan, 32
Nido Bed, 163
No. 27 Design, 86
Norberg-Schulz, xix
Nunziato, Simone, 161
Nuvola di Luce chair, 203

O
Object layouts, 23
Object to object fixing, 114
Office interior, 192
Office of Metropolitan Architecture, 92
Ogawa, Shigeo, 134
Oki Sato, 87
Oldfield Knott Architects, 178
Onda Range, 163
Osgerby, Jay, 154
Ove Arup and Partners, 94

P
Palazzo Grassi, 148
Pallotta Teamworks, 152, 182
Pantheon, Rome, 214
Paolelli, Meneghello, 166
Parker Morris, 71
Particular Architects, 121
Partisans, 91
Partition, 12
Paul, Judith, 153
Paxton, Joseph, 134
Percy Thomas Partnership, 87
Pérez, Javier, 60
Perfectionist café, Heathrow, 178
Phototaxis, 187
Picketts, Dave, 181
Picogna/Ikon, 166
Pile, John, 127, 186
Pilkington, 155
Pilkington, Sir Alastair, 207
Pint Shop, 173
Placebo Pharmacy, 34, 35, 48, 194
Placement of object, 22
Plain Box, 68
Planning Concept, 2
Plan patterns, 5
Plastic laminate, 143
Plowright, Philip, xvii, xix, xxiii
Point d'orgue, 44, 150
Poldma, Tiiu, xx, 127
Porsch Pavilion, 18
Powell-Tuck, Connor and Orefelt, 95
Proportional Judgement, 174
Pub interior, 172
Punta della Dogana, 149

R
Rand, Patrick, 141
Rasmussen, Steen Eiler, 157
Rayen Restaurant, 184
Realisation sequence, 56
Rengel, Roberto, xxi
Renzo Piano, 94
Retail lighting, 198
Richard Rogers Ptnrsp, 51
Richijheath, 214
Rivera, Eunice, 201
Rock Star Villa, 9, 153
Ronan and Erwan, 124, 125
Rooflights, 187
Rubio, Alberto, 9, 153

S
Safdie, Moshe, 41
Salingaros, xviii
Samoo Architects & Engineers, 155
Sander, Karin, 215
Santa Margherita, 144
Sauerbruch Hutton, 215
Saunders Architects, 180
Sawmill, 141
Scarpa, Carlo, 145
Schott, Randolf, 31
Scored plasterboard, 113
Scott, Fred, xxii
Seating, 158
Seating stones, 180
Serpentine Sackler Gallery, 147, 212
Shape, 183
Shelf, 124
Shelving, 161
Shenzhen Bao'an International Airport, 148, 188
Shopenn, Michael, 198
Shulman and Associates, 212
Simpson and Brown, 59, 211
Single colour dominance, 174
Single Cube Room, 68
Skyhouse Penthouse, 65
Smithson, Alison and Peter, 135
Smolenicky and Partner, 30
Snug, The, 158
Society of British and International Design, 231
Sodhi, Ar Rajat, 142
Solera Corp, 201
Space and Light, 57
Spiral, 130
Square, 61
St Alban Restaurant, 194
St Albert the Great Chapel, 58
St Matthew's Church, 79
Stairtread, 129
State Bank of India, 161
Stiff and Trevillion, 196
Stone, Sally, xxii
Stool, 158
Storage, 28
Storage essentials, 164
Storage units, 164
Stormwindows, 209
Structure, 149
Studio Mieke Meijer, 84
Studio Thesia Progetti, 202
Sugino, Kei, 98, 222

Sullivan, Louis, 76
Sully, Anthony, v, xxi, 31, 128
Sundblad, Filip, 32
Sunset Point House, 197
Support systems, 10, 157
Surface Architects, 97, 183, 184
Surface finishes, 153
Surfrider Foundation Europe, 44, 45, 150–152, 217
Suspended stair, 84
Symbiosis bath, 165

T
Table, 122, 160
Taj Mahal, 75
Takeguchi, Kentaro, 98, 222
Tallis, 135
Task lighting, 191
Taylor and Miller, 62, 192
Teatrino, The, 148
Testi, 197
ThinQ, 144
Thomas, Rodney, 84
Thonet, 31
Thony, Günther, 163
Tinyfroglet, 136
Torafu Architects, 32
Torggler, Klemens, 114
Triangle, 61, 64
Tribal DBB, 46
Tschumi, Bernard, 92

U
Umami bowl, 142
UN studio, 24, 181
Uncino chair, 124, 125
Unit type, 147
Unwin, Simon, xx
Uribarri, Nicolás, 60

V
Vandervort, David, 198
Vanguard Foundry, 142
Venini furnace, 197
Vertical circulation, 47
Victorian interior, 67
Viñas, Ghislaine, 65
Volshotel Amsterdam, 66

W
Waagner Biro, 213
Wall hung desk, 111
Walter Knoll, 180
Wardrobes, 164
Warhole, Andy, 183
Washington Park Residence, 219
Wave sanitary ware, 166
Weigand, John, xx
Weinheim House, 99
White, Allison Carll, xx
Wiktorowicz, Igor, 159
Wilkinson, Clive, 152, 182
Window House, Kyoto, 132
Windows, 207
Window seat, 83
Witamina, 159
Wondertrees Restaurant, Heathrow, 205
Wood, Nick, 83
Workbenches, Counters, 161
Workplace solutions, 161

Y
Yao, Kris, 25
Yasuda, Makoto, 100

Z
Zanetta, Alo, 210
Zeisel, John, 4
Zenz, Rainer, 75